



## SEQUENCE LISTING

<110> OMURA, Masao  
IKEDA, Haruo

<120> AVERMECTIN AGLYCON SYNTHASE GENES

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<210> 1

<211> 30690

<212> DNA

<213> Streptomyces avermitilis

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Pro Leu Thr Ala Phe Val Leu Tyr Ser Ser Ala Ala Ala Thr Phe Gly	
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2005 2010 2015	

ttc cgt gca ctc ggc ttc gat tca ctc acg gcc gtc gag ttc cga aac	6096
Phe Arg Ala Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Phe Arg Asn	
2020 2025 2030	
ctg ctg atc aag gca aca gga ctc cgc ctt cct gtc tcg ctg gtc ttc	6144
Leu Leu Ile Lys Ala Thr Gly Leu Arg Leu Pro Val Ser Leu Val Phe	
2035 2040 2045	
gac cac ccg acc cct gcc aaa ctc gcc gta cac ctg cag aac caa ctg	6192
Asp His Pro Thr Pro Ala Lys Leu Ala Val His Leu Gln Asn Gln Leu	
2050 2055 2060	
cgg ggc aca gca gcg gag tcg gct cct tca gcg gca gcc gtt acc gcc	6240
Arg Gly Thr Ala Ala Glu Ser Ala Pro Ser Ala Ala Val Thr Ala	
2065 2070 2075 2080	
gag gct tct gtc acc gag ccg atc gcc atc gtt ggc atg gcc tgt cgt	6288
Glu Ala Ser Val Thr Glu Pro Ile Ala Ile Val Gly Met Ala Cys Arg	
2085 2090 2095	
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Phe Pro Gly Gly Val Thr Ser Ala Asp Asp Phe Trp Asp Leu Ile Ser	
2100 2105 2110	
tcc gag cag gac gcg atc ggc gga ttc ccc acc gac cgc ggc tgg gac	6384
Ser Glu Gln Asp Ala Ile Gly Gly Phe Pro Thr Asp Arg Gly Trp Asp	
2115 2120 2125	
ctg gac acg ctc tac gac ccc gac ccc gac cac ccc ggc acc tgc tac	6432
Leu Asp Thr Leu Tyr Asp Pro Asp Pro Asp His Pro Gly Thr Cys Tyr	
2130 2135 2140	
acc cga aac ggc gga ttc ctc tac gac gca ggc cac ttc gac gcc gaa	6480
Thr Arg Asn Gly Gly Phe Leu Tyr Asp Ala Gly His Phe Asp Ala Glu	
2145 2150 2155 2160	
ttc ttc ggc atc agc ccc cgc gaa gcc ctc gcc atg gac ccc cag caa	6528
Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln	
2165 2170 2175	
cga ctc ctc ctc gaa acc gcc tgg gaa acc atc gaa cac gcc ggc atc	6576
Arg Leu Leu Leu Glu Thr Ala Trp Glu Thr Ile Glu His Ala Gly Ile	
2180 2185 2190	
aac ccc cac acc ctc cac ggc acc ccc acc gga gtc ttc acc ggc acc	6624
Asn Pro His Thr Leu His Gly Thr Pro Thr Gly Val Phe Thr Gly Thr	
2195 2200 2205	
aac gga cag gac tac gca ctt cgc gtg cac aac gcg ggc cag tca acc	6672
Asn Gly Gln Asp Tyr Ala Leu Arg Val His Asn Ala Gly Gln Ser Thr	
2210 2215 2220	
gat ggt ttc gca ctg acc gga acc gcc ggc agc gtc atc tcc ggt cgt	6720
Asp Gly Phe Ala Leu Thr Gly Thr Ala Gly Ser Val Ile Ser Gly Arg	
2225 2230 2235 2240	
atc tcg tac acg ttt ggt ttt gag ggt cct gcg gtg tcg gtg gac acg	6768
Ile Ser Tyr Thr Phe Gly Phe Glu Gly Pro Ala Val Ser Val Asp Thr	
2245 2250 2255	

gct tgt tcc tcg tcg ttg gtg gct ttg cat ctg gcc tgt cag gcg ttg	6816
Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Cys Gln Ala Leu	
2260 2265 2270	
cgT gcg ggt gag tgc tcg atg gcg ctt gcc ggg ggt gtg acg gtg atg	6864
Arg Ala Gly Glu Cys Ser Met Ala Leu Ala Gly Gly Val Thr Val Met	
2275 2280 2285	
tcg tct ccg ggt gcc ttc gtg gag ttt tcg cgg cag cgg ggt ctg gcc	6912
Ser Ser Pro Gly Ala Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala	
2290 2295 2300	
gcg gac ggg cat tgc aag gcg ttc tcg gcg gcg gcg gac ggg acc ggc	6960
Ala Asp Gly His Cys Lys Ala Phe Ser Ala Ala Asp Gly Thr Gly	
2305 2310 2315 2320	
tgg ggt gag ggt gtg ggg atg ctg ctg gtg gag cgg ctc tcc gac gcc	7008
Trp Gly Glu Gly Val Gly Met Leu Leu Val Glu Arg Leu Ser Asp Ala	
2325 2330 2335	
cat cgc aac ggt cac cgt gtc ctg gcc gtg gtg cgt ggc agt gcg gtc	7056
His Arg Asn Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val	
2340 2345 2350	
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Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser	
2355 2360 2365	
cag cag cgt gtc atc cgc cag gcc ctc gcc aac gcc ggc ttg tcg gcc	7152
Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asn Ala Gly Leu Ser Ala	
2370 2375 2380	
ggt gat gtc gac gcg gtg gag gcc cac ggc acc ggc acc act ttg ggc	7200
Gly Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Thr Leu Gly	
2385 2390 2395 2400	
gac ccg atc gag gcc cag gcc ctc ctc gcg acc tac gga cag gac cgt	7248
Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Asp Arg	
2405 2410 2415	
gcc ggc gag ggg ccg ctg tgg ctg ggc tcg gtc aag tcc aat gtc ggt	7296
Ala Gly Glu Gly Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Val Gly	
2420 2425 2430	
cac aca cag gct gcc gcg ggc gtc gcc ggg gtg atc aag atg gtg atg	7344
His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Met	
2435 2440 2445	
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Ala Leu Arg His Gly Leu Leu Pro Arg Thr Leu His Val Asp Glu Pro	
2450 2455 2460	
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Ser Pro His Val Asp Trp Ser Ala Gly Ala Val Gln Leu Leu Thr Glu	
2465 2470 2475 2480	
acg gtg ccc tgg ccc ggc ggg gag ggg cgg cta cgg cgg gca gga gtg	7488
Thr Val Pro Trp Pro Gly Gly Glu Gly Arg Leu Arg Arg Ala Gly Val	
2485 2490 2495	

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Ser Ser Phe Gly Val Ser Gly Thr Asn Ala His Val Ile Leu Glu Glu	
2500 2505 2510	
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Ala Pro Ala Asp Asp Val Pro Gly Gly Pro Pro Ala Gly Glu Gly Asp	
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Ala Gly Ser Asp Asp Glu Ala Ala Ala Gly Ser Pro Gly Val Trp Pro	
2530 2535 2540	
tgg ctg gtg tcg gcc aag tcg cag ccg gcc ctg cgc gcc cag gcc cag	7680
Trp Leu Val Ser Ala Lys Ser Gln Pro Ala Leu Arg Ala Gln Ala Gln	
2545 2550 2555 2560	
gcc ctg cac gcc cac ctc acc gac cac ccc ggc ctc gac ctc gcg gat	7728
Ala Leu His Ala His Leu Thr Asp His Pro Gly Leu Asp Leu Ala Asp	
2565 2570 2575	
gtc gga tac acc ctc gcc cac gcc cgc gcc gtg ttc gac cac cgc gcc	7776
Val Gly Tyr Thr Leu Ala His Ala Arg Ala Val Phe Asp His Arg Ala	
2580 2585 2590	
acc ctc atc gcc gcg gac cgc gac acg ttc ctg caa gca ctc cag gca	7824
Thr Leu Ile Ala Ala Asp Arg Asp Thr Phe Leu Gln Ala Leu Gln Ala	
2595 2600 2605	
ctc gcc gca ggc gag ccc cac ccc gcc gtc atc cac agc agc gcc ccg	7872
Leu Ala Ala Gly Glu Pro His Pro Ala Val Ile His Ser Ser Ala Pro	
2610 2615 2620	
ggc ggg acc ggg acc ggg gag gcc gca gga aag acc gca ttc atc tgc	7920
Gly Gly Thr Gly Thr Gly Glu Ala Ala Gly Lys Thr Ala Phe Ile Cys	
2625 2630 2635 2640	
tcc gga cag ggc acc caa cgc ccc ggc atg gcc cac ggc ctc tac cac	7968
Ser Gly Gln Gly Thr Gln Arg Pro Gly Met Ala His Gly Leu Tyr His	
2645 2650 2655	
acc cac ccc gtc ttc gcc gcc gca ctc aac gac atc tgc acc cac ctc	8016
Thr His Pro Val Phe Ala Ala Ala Leu Asn Asp Ile Cys Thr His Leu	
2660 2665 2670	
gac ccc cac ctc gac cac ccc ctc ctc ccc ctc ctc acc caa aac gac	8064
Asp Pro His Leu Asp His Pro Leu Leu Pro Leu Leu Thr Gln Asn Asp	
2675 2680 2685	
aac gac aac gag gac gcg gcc gca ctg ctc cag cag acc cgc tac gcc	8112
Asn Asp Asn Glu Asp Ala Ala Ala Leu Leu Gln Gln Thr Arg Tyr Ala	
2690 2695 2700	
cag ccc gcc ctc ttc gcc ttc cag gtc gcc ctc cac cgc ctc ctc acc	8160
Gln Pro Ala Leu Phe Ala Phe Gln Val Ala Leu His Arg Leu Leu Thr	
2705 2710 2715 2720	
gac ggc tac cac atc acc ccc cac tac tac gcc gga cac tcc ctc gcc	8208
Asp Gly Tyr His Ile Thr Pro His Tyr Tyr Ala Gly His Ser Leu Gly	
2725 2730 2735	



gaa atc acc gcc gcc cac ctc gcc ggc atc ctc acc ctc acc gac gcc	8256
Glu Ile Thr Ala Ala His Leu Ala Gly Ile Leu Thr Leu Thr Asp Ala	
2740 2745 2750	
acc acc ctc atc acc caa cgc gcc acc ctc atg caa acc atg ccc ccc	8304
Thr Thr Leu Ile Thr Gln Arg Ala Thr Leu Met Gln Thr Met Pro Pro	
2755 2760 2765	
ggc acc atg acc acc ctc cac acc acc ccc cac cac atc acc cac cac	8352
Gly Thr Met Thr Thr Leu His Thr Thr Pro His His Ile Thr His His	
2770 2775 2780	
ctc acc gcc cac gaa aac gac ctc gcc atc gcc gcc atc aac acc ccc	8400
Leu Thr Ala His Glu Asn Asp Leu Ala Ile Ala Ala Ile Asn Thr Pro	
2785 2790 2795 2800	
acc tcc ctc gtc atc agc ggc acc ccc cac acc gtc caa cac atc acc	8448
Thr Ser Leu Val Ile Ser Gly Thr Pro His Thr Val Gln His Ile Thr	
2805 2810 2815	
acc ctc tgc caa caa caa ggc atc aaa acc aaa acc ctc ccc acc aac	8496
Thr Leu Cys Gln Gln Gln Gly Ile Lys Thr Lys Thr Leu Pro Thr Asn	
2820 2825 2830	
cac gcc ttc cac tcc ccc cac acc aac ccc atc ctc aac caa ctc cac	8544
His Ala Phe His Ser Pro His Thr Asn Pro Ile Leu Asn Gln Leu His	
2835 2840 2845	
cag cac acc caa acc ctc acc tac cac cca ccc cac acc ccc ctc atc	8592
Gln His Thr Gln Thr Leu Thr Tyr His Pro Pro His Thr Pro Leu Ile	
2850 2855 2860	
acc gcc aac acc cca ccc gac caa ctc ctc acc ccc cac tac tgg acc	8640
Thr Ala Asn Thr Pro Pro Asp Gln Leu Leu Thr Pro His Tyr Trp Thr	
2865 2870 2875 2880	
caa caa gcc cgc aac acc gtc gac tac gcc acc acc acc caa acc ctc	8688
Gln Gln Ala Arg Asn Thr Val Asp Tyr Ala Thr Thr Thr Gln Thr Leu	
2885 2890 2895	
cac caa cac ggc gtc acc acc tac atc gaa ctc gga ccc gac aac acc	8736
His Gln His Gly Val Thr Thr Tyr Ile Glu Leu Gly Pro Asp Asn Thr	
2900 2905 2910	
ctc acc acc ctc acc cac cac aac ctc ccc aac ccc ccc acc acc acc	8784
Leu Thr Thr Leu Thr His His Asn Leu Pro Asn Pro Pro Thr Thr Thr	
2915 2920 2925	
ctc acc ctc acc cac ccc cac cac cac ccc caa acc cac ctc ctc acc	8832
Leu Thr Leu Thr His Pro His His His Pro Gln Thr His Leu Leu Thr	
2930 2935 2940	
aac ctc gcc aaa acc acc acc acc tgg cac ccc cac cac tac acc cac	8880
Asn Leu Ala Lys Thr Thr Thr Thr Trp His Pro His His Tyr Thr His	
2945 2950 2955 2960	
cac gac aac caa ccc cac acc cac acc cac ctc gac ctc ccc acc tac	8928
His Asp Asn Gln Pro His Thr His Thr His Leu Asp Leu Pro Thr Tyr	
2965 2970 2975	

ccc ttc caa cac cac cac tac tgg ctc gaa agc aca cag ccc ggt gcc	8976
Pro Phe Gln His His His Tyr Trp Leu Glu Ser Thr Gln Pro Gly Ala	
2980 2985 2990	
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Gly Asn Val Ser Ala Ala Gly Leu Asp Pro Thr Glu His Pro Leu Leu	
2995 3000 3005	
ggc gcc aca ttg gaa ctg gcg act gac ggt gga gcg ctt ctt gca ggg	9072
Gly Ala Thr Leu Glu Leu Ala Thr Asp Gly Gly Ala Leu Leu Ala Gly	
3010 3015 3020	
cgc ttg tct ttg agg tgc cat ccg tgg ctg gct gac cat gcc gtc ggc	9120
Arg Leu Ser Leu Arg Ser His Pro Trp Leu Ala Asp His Ala Val Gly	
3025 3030 3035 3040	
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Gly Thr Val Leu Leu Ser Gly Ala Thr Phe Leu Glu Leu Ala Leu His	
3045 3050 3055	
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Ala Gly Thr Tyr Val Gly Cys Asp Arg Val Asp Glu Leu Thr Leu His	
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Ala Pro Leu Val Val Pro Val Asp Gly Gly Val Ser Val Gln Val Gly	
3075 3080 3085	
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Val Ala Ala Ala Asp Gly Glu Gly Arg Arg Leu Val Ser Val Tyr Ala	
3090 3095 3100	
ccg ggt ggg agt gct tgt ggt ggg ggt ggt gcg tgc ggt ggg gtg tgg	9360
Arg Gly Gly Ser Ala Cys Gly Gly Gly Gly Ala Ser Gly Gly Val Trp	
3105 3110 3115 3120	
acg tgt cat gcc tgc ggg gtg ctg gtt gag gct gct gct ggt ggt gtg	9408
Thr Cys His Ala Ser Gly Val Leu Val Glu Ala Ala Ala Gly Gly Val	
3125 3130 3135	
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Val Val Asp Gly Leu Ala Gly Val Trp Pro Pro Arg Gly Ala Val Ala	
3140 3145 3150	
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Val Asp Val Asp Gly Val Arg Asp Arg Leu Ala Gly Ala Gly Cys Val	
3155 3160 3165	
ttg ggg ccg gtg ttt tgc ggg ctg cgt gcg gtg tgg cgt gat ggg ggg	9552
Leu Gly Pro Val Phe Ser Gly Leu Arg Ala Val Trp Arg Asp Gly Gly	
3170 3175 3180	
gat ttg ctg gct gag gtg tgt ctg ccg gag gag gcg tgg ggt gat gcg	9600
Asp Leu Leu Ala Glu Val Cys Leu Pro Glu Glu Ala Trp Gly Asp Ala	
3185 3190 3195 3200	
gct ggt ttt ggg ctg cat ccg gcg ttg ctg gat ggt gtg gtc cag ccg	9648
Ala Gly Phe Gly Leu His Pro Ala Leu Leu Asp Gly Val Val Gln Pro	
3205 3210 3215	

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Leu Ser Val Leu Leu Pro Gly Gly Thr Gly Phe Gly Glu Gly Ala Gly	
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Phe Gly Glu Gly Val Arg Val Pro Ala Val Trp Gly Gly Val Ser Leu	
3235 3240 3245	
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His Arg Ala Gly Val Thr Gly Val Arg Val Arg Val Ser Ala Val Gly	
3250 3255 3260	
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Arg Gly Gly Gly Arg Glu Ala Val Ser Val Val Gly Asp Glu Ala	
3265 3270 3275 3280	
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Gly Val Pro Val Ala Ser Val Asp Arg Leu Glu Leu Arg Pro Val Asp	
3285 3290 3295	
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Met Gly Gln Leu Arg Ala Val Ser Val Ser Ala Gly Arg Arg Gly Ser	
3300 3305 3310	
ctg tat gcg gtg cag tgg gct gag gtg ggt cct gtg ccg gtg tgt ggg	9984
Leu Tyr Ala Val Gln Trp Ala Glu Val Gly Pro Val Pro Val Cys Gly	
3315 3320 3325	
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Gln Ala Trp Ala Trp His Glu Asp Val Gly Glu Ser Gly Gly Gly Pro	
3330 3335 3340	
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Val Pro Gly Val Val Val Leu Arg Cys Pro Asp Ala Gly Ala Gly Gly	
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Gly Gly Gly Gly Gly Gly Gly Gly Gly Val Gly Glu Val Val Gly Gly	
3365 3370 3375	
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Val Leu Gly Val Val Gln Gly Trp Leu Gly Leu Glu Arg Phe Ala Gly	
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Ser Arg Leu Val Val Val Thr Arg Gly Ala Val Val Ala Gly Pro Glu	
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Asp Gly Pro Val Asp Val Val Gly Ala Ser Val Trp Gly Leu Val Arg	
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Ser Ala Gln Ala Glu His Pro Asp Arg Phe Val Leu Leu Asp Leu Asp	
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Thr Asp Thr Gly Thr Asp Leu Asp Thr Gly Ala Gly Ala Gly Trp Gly	
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Val Asp Gly Gly Arg Val Ala Ala Val Val Ala Cys Gly Glu Pro Gln	
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ttg gcg gtg cgt ggg gag cgg ttg ctg gcc gca cgc ctg aaa cga ctt	10464
Leu Ala Val Arg Gly Glu Arg Leu Leu Ala Ala Arg Leu Lys Arg Leu	
3475 3480 3485	
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Glu Ser Ser Gly Asp Val Pro Ala Gln Arg Ser Gly Asp Thr Arg Ala	
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Arg Arg Ser Asp Val Pro Ala Gln Arg Ser Gly Gly Val Pro Ala Arg	
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Arg Ser Val Asp Val Ser Gly Arg Glu Val Leu Pro Trp Leu Ser Gly	
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Gly Ser Val Leu Val Thr Gly Gly Thr Gly Val Leu Gly Ala Ala Val	
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Ala Arg His Leu Ala Gly Val Cys Gly Val Arg Asp Leu Leu Leu Val	
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Ser Arg Arg Gly Pro Asp Ala Pro Gly Ala Glu Gly Leu Arg Ala Glu	
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Leu Ala Ala Leu Gly Ala Glu Val Arg Ile Val Ala Cys Asp Val Gly	
3585 3590 3595 3600	
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Glu Arg Arg Glu Val Val Arg Leu Leu Glu Gly Val Pro Ala Gly Cys	
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Pro Leu Thr Gly Val Val His Ala Ala Gly Val Leu Asp Asp Ala Thr	
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Ile Ala Ser Leu Thr Pro Glu Arg Leu Gly Thr Val Phe Ala Ala Lys	
3635 3640 3645	
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Val Asp Ala Ala Leu Leu Asp Glu Leu Thr Arg Gly Met Glu Leu	
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Ser Ala Phe Val Leu Phe Ser Ser Ala Ala Gly Ile Leu Gly Ser Ala	
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Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala Ala Leu Asp Ala Leu Ala	
3685 3690 3695	

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ctg tgg gaa gag gcc agc ggg atg acc ggg cac ctg gcc ggc acc gac Leu Trp Glu Glu Ala Ser Gly Met Thr Gly His Leu Ala Gly Thr Asp 3715 3720 3725	11184
cac cgg cgc atc atc cgt tcc ggt ctg cat ccc atg tcg acc ccg gac His Arg Arg Ile Ile Arg Ser Gly Leu His Pro Met Ser Thr Pro Asp 3730 3735 3740	11232
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atc gcc acc gtc ctg ggc cac acc acc ccc gac acc atc ccc ccc gac Ile Ala Thr Val Leu Gly His Thr Thr Pro Asp Thr Ile Pro Pro Asp 3825 3830 3835 3840	11520
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caa ctc cag cca caa ccg gac aac gct gtc gcc ccc gtg ttg gcg gag Gln Leu Gln Pro Gln Pro Asp Asn Ala Val Ala Pro Val Leu Ala Glu 3890 3895 3900	11712
ctc gac aaa ctc gaa tcc gcc ctc tcc gcc ctc gac aaa acc gac agc Leu Asp Lys Leu Glu Ser Ala Leu Ser Ala Leu Asp Lys Thr Asp Ser 3905 3910 3915 3920	11760
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ttc aca tcg gca aca gag gct gag att ttc aaa ttc att gac aac gac Phe Thr Ser Ala Thr Glu Ala Glu Ile Phe Lys Phe Ile Asp Asn Asp 3955 3960 3965	11904
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ctc aag cgc gtc act gcg gac ctg gac cgc act cgc cgt cgc ctg tac Leu Lys Arg Val Thr Ala Asp Leu Asp Arg Thr Arg Arg Arg Leu Tyr 3985 3990 3995 4000	12054
gag gtg gtc gag cgt gag cag gag ccg atc gcg att gtg ggg atg gcg Glu Val Val Glu Arg Glu Gln Glu Pro Ile Ala Ile Val Gly Met Ala 4005 4010 4015	12102
tgt cgt tac cca ggc ggg gcg acg tca ccc acg cga ctg tgg cat ctc Cys Arg Tyr Pro Gly Gly Ala Thr Ser Pro Thr Arg Leu Trp His Leu 4020 4025 4030	12150
gtc aag tcc cag acg gac gct atc ggg gag ttc ccg acc gac cgt gga Val Lys Ser Gln Thr Asp Ala Ile Gly Glu Phe Pro Thr Asp Arg Gly 4035 4040 4045	12198
tgg aac ctg gag cag ctc tac gac ccg gac ccc gac cgc tca gga acc Trp Asn Leu Glu Gln Leu Tyr Asp Pro Asp Pro Asp Arg Ser Gly Thr 4050 4055 4060	12246
agt tac acg cgc agc gga ggg ttt ctc tat gac gcg ggc gac ttc gac Ser Tyr Thr Arg Ser Gly Gly Phe Leu Tyr Asp Ala Gly Asp Phe Asp 4065 4070 4075 4080	12294
gcc gcg ttc ttc gag ttg tca ccg cgt gag gcg ctg gca atg gac ccg Ala Ala Phe Phe Glu Leu Ser Pro Arg Glu Ala Leu Ala Met Asp Pro 4085 4090 4095	12342
cag cag cgc ctg ctg ctc gaa acc act tgg gaa acg ttc gaa cag ggc Gln Gln Arg Leu Leu Leu Glu Thr Thr Trp Glu Thr Phe Glu Gln Gly 4100 4105 4110	12390
gga atc gac ccg agg tcc atg cgc gga agc cgg acc ggg gtt ttc gtg Gly Ile Asp Pro Arg Ser Met Arg Gly Ser Arg Thr Gly Val Phe Val 4115 4120 4125	12438
ggg atc aat ccg gag gac tac acc acc gga tac aca cat cag ccc tca Gly Ile Asn Pro Glu Asp Tyr Thr Thr Gly Tyr Thr His Gln Pro Ser 4130 4135 4140	12486
aac gca gtc gag ggc tac ctg ctc act ggc agc gcg gca agc att gcg Asn Ala Val Glu Gly Tyr Leu Leu Thr Gly Ser Ala Ala Ser Ile Ala 4145 4150 4155 4160	12534

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caa gcg ctc cgg tcc ggt gaa tgc acc atg gcg ctc gca ggc ggc gcc Gln Ala Leu Arg Ser Gly Glu Cys Thr Met Ala Leu Ala Gly Gly Ala 4195 4200 4205	12678
tcc gtc atg gcc act ccc ttc gtc ttc acc gag ttc tct cgc cag cgg Ser Val Met Ala Thr Pro Phe Val Phe Thr Glu Phe Ser Arg Gln Arg 4210 4215 4220	12726
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tcc gac gcc cgc cgc aac ggt cac cgt gtc ctg gcc gtc gtc cgc ggc Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val Arg Gly 4260 4265 4270	12870
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ggt cgt tca caa gtc aag gtc atc cgc cag gct ttg gcc aac gca cac Gly Arg Ser Gln Val Lys Val Ile Arg Gln Ala Leu Ala Asn Ala His 4290 4295 4300	12966
ctc tcc cct gcc gat gtc gat gcg gtg gag gcc cac ggc acg ggg acc Leu Ser Pro Ala Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr 4305 4310 4315 4320	13014
acc ctg ggc gac ccg atc gag gct caa gcc ctc gtc gaa gcc tac ggt Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Val Glu Ala Tyr Gly 4325 4330 4335	13062
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atg gtg atg gcg ctg cgg aat ggt ctg ctg ccg cgg acg ttg cat gtg Met Val Met Ala Leu Arg Asn Gly Leu Leu Pro Arg Thr Leu His Val 4370 4375 4380	13206
gat gag ccg tcg ccg cat gtg gac tgg tcc gcg ggt gcg gtg cag ctg Asp Glu Pro Ser Pro His Val Asp Trp Ser Ala Gly Ala Val Gln Leu 4385 4390 4395 4400	13254

ctg acg gag acg gtg ccc tgg ccc ggc ggg gag ggg cgg cta cgg cgg	13302
Leu Thr Glu Thr Val Pro Trp Pro Gly Gly Glu Gly Arg Leu Arg Arg	
4405 4410 4415	
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Ala Gly Val Ser Ser Phe Gly Val Ser Gly Thr Asn Ala His Val Ile	
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ctc gag gaa gca ccc gcc cac aac atc ccg tca gac aca ccc gcc gac	13398
Leu Glu Glu Ala Pro Ala His Asn Ile Pro Ser Asp Thr Pro Ala Asp	
4435 4440 4445	
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Asp Val Pro Gly Glu Ser Ala Ala Asp Glu Asp Ala Gly Ser Gly Asp	
4450 4455 4460	
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Glu Ala Ala Ala Gly Ser Pro Gly Val Trp Pro Trp Leu Val Ser Ala	
4465 4470 4475 4480	
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Lys Ser Gln Pro Ala Leu Arg Ala Gln Ala Gln Ala Leu His Ala His	
4485 4490 4495	
ctc acc gac cac ccc ggc ctc gac ctc gcc gac gtc ggg tac acc ctc	13590
Leu Thr Asp His Pro Gly Leu Asp Leu Ala Asp Val Gly Tyr Thr Leu	
4500 4505 4510	
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Ala His Ala Arg Ala Val Phe Asp His Arg Ala Thr Leu Ile Ala Ala	
4515 4520 4525	
gac cgc gac acc ttc ctg caa gca ctc cag gca ctc gcc gca ggc gaa	13686
Asp Arg Asp Thr Phe Leu Gln Ala Leu Gln Ala Leu Ala Ala Gly Glu	
4530 4535 4540	
ccc cac ccc gcc gtc atc cac agc agc gcc cca ggc ggg acc ggc acc	13734
Pro His Pro Ala Val Ile His Ser Ser Ala Pro Gly Gly Thr Gly Thr	
4545 4550 4555 4560	
ggg gag gcc gca gga aag acc gca ttc atc tgc tcc gga cag ggc acc	13782
Gly Glu Ala Ala Gly Lys Thr Ala Phe Ile Cys Ser Gly Gln Gly Thr	
4565 4570 4575	
caa cgc ccc ggc atg gcc cac ggc ctc tac cac acc cac ccc gtc ttc	13830
Gln Arg Pro Gly Met Ala His Gly Leu Tyr His Thr His Pro Val Phe	
4580 4585 4590	
gcc gcc gca ctc aac gac atc tgc acc cac ctc gac ccc cac ctc gac	13878
Ala Ala Ala Leu Asn Asp Ile Cys Thr His Leu Asp Pro His Leu Asp	
4595 4600 4605	
cac ccc ctc ctc ccc ctc ctc acc cag gac ccc aac acc cag gac acc	13926
His Pro Leu Leu Pro Leu Leu Thr Gln Asp Pro Asn Thr Gln Asp Thr	
4610 4615 4620	
acc acc ctc gaa gaa gcg gcc gca ctg ctc cag cag acc cgc tac gcc	13974
Thr Thr Leu Glu Glu Ala Ala Ala Leu Leu Gln Gln Thr Arg Tyr Ala	
4625 4630 4635 4640	



cag ccc gcc ctc ttc gcc ttc cag gtc gcc ctc cac cgc ctc ctc acc	14022
Gln Pro Ala Leu Phe Ala Phe Gln Val Ala Leu His Arg Leu Leu Thr	
4645 4650 4655	
gac ggc tac cac atc acc ccc cac tac tac gcc gga cac tcc ctc ggc	14070
Asp Gly Tyr His Ile Thr Pro His Tyr Tyr Ala Gly His Ser Leu Gly	
4660 4665 4670	
gaa atc acc gcc gcc cac ctc gcc ggc atc ctc acc ctc acc gac gcc	14118
Glu Ile Thr Ala Ala His Leu Ala Gly Ile Leu Thr Leu Thr Asp Ala	
4675 4680 4685	
acc acc ctc atc acc caa cgc gcc acc ctc atg caa acc atg ccc ccc	14166
Thr Thr Leu Ile Thr Gln Arg Ala Thr Leu Met Gln Thr Met Pro Pro	
4690 4695 4700	
ggc acc atg acc acc ctc cac acc acc ccc cac cac atc acc cac cac	14214
Gly Thr Met Thr Thr Leu His Thr Thr Pro His His Ile Thr His His	
4705 4710 4715 4720	
ctc acc gcc cac gaa aac gac ctc gcc atc gcc gcc atc aac acc ccc	14262
Leu Thr Ala His Glu Asn Asp Leu Ala Ile Ala Ala Ile Asn Thr Pro	
4725 4730 4735	
acc tcc ctc gtc atc agc ggc acc ccc cac acc gtc caa cac atc acc	14310
Thr Ser Leu Val Ile Ser Gly Thr Pro His Thr Val Gln His Ile Thr	
4740 4745 4750	
acc ctc tgc caa caa caa ggc atc aaa acc aaa acc ctc ccc acc aac	14358
Thr Leu Cys Gln Gln Gln Gly Ile Lys Thr Lys Thr Leu Pro Thr Asn	
4755 4760 4765	
cac gcc ttc cac tcc ccc cac acc aac ccc atc ctc aac caa ctc cac	14406
His Ala Phe His Ser Pro His Thr Asn Pro Ile Leu Asn Gln Leu His	
4770 4775 4780	
cag cac acc caa acc ctc acc tac cac cca ccc cac acc ccc ctc atc	14454
Gln His Thr Gln Thr Leu Thr Tyr His Pro Pro His Thr Pro Leu Ile	
4785 4790 4795 4800	
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Thr Ala Asn Thr Pro Pro Asp Gln Leu Leu Thr Pro His Tyr Trp Thr	
4805 4810 4815	
caa caa gcc cgc aac acc gtc gac tac gcc acc acc acc caa acc ctc	14550
Gln Gln Ala Arg Asn Thr Val Asp Tyr Ala Thr Thr Thr Gln Thr Leu	
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cac caa cac ggc gtc acc acc tac atc gaa ctc gga ccc gac aac acc	14598
His Gln His Gly Val Thr Thr Tyr Ile Glu Leu Gly Pro Asp Asn Thr	
4835 4840 4845	
ctc acc acc ctc acc cac gac aac ctc ccc aac acc ccc acc acc acc	14646
Leu Thr Thr Leu Thr His Asp Asn Leu Pro Asn Thr Pro Thr Thr Thr	
4850 4855 4860	
ctc acc ctc acc cac ccc cac cac cac ccc caa acc cac ctc ctc acc	14694
Leu Thr Leu Thr His Pro His His His Pro Gln Thr His Leu Leu Thr	
4865 4870 4875 4880	

aac ctc gcc aaa acc acc acc acc tgg cac ccc cac cac tac acc cac	14742
Asn Leu Ala Lys Thr Thr Thr Thr Trp His Pro His His Tyr Thr His	
4885 4890 4895	
cac cac aac caa ccc cac acc cac acc cac ctc gac ctc ccc acc tac	14790
His His Asn Gln Pro His Thr His Thr His Leu Asp Leu Pro Thr Tyr	
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ccc ttc caa cac cac cac tac tgg ctc caa cca ccc ggc aag ccg agc	14838
Pro Phe Gln His His His Tyr Trp Leu Gln Pro Pro Gly Lys Pro Ser	
4915 4920 4925	
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Asp Pro Ser Pro Ser Glu Gly Arg Glu Gln Ala Thr Thr Pro Ser Thr	
4930 4935 4940	
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Pro Leu Arg Asp Val Leu Val Gly Lys Ser Pro Gln Glu Arg Asp Glu	
4945 4950 4955 4960	
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Glu Leu Leu Arg Leu Val Arg Thr His Ala Ala Ala Val Leu Gly His	
4965 4970 4975	
gcc act ccc gaa gtg atc gtt ccg aac aag gcc ttc aaa gag ctg ggt	15030
Ala Thr Pro Glu Val Ile Val Pro Asn Lys Ala Phe Lys Glu Leu Gly	
4980 4985 4990	
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Phe Asp Ser Leu Ala Ala Ile Gln Leu Arg Asn Arg Leu Leu Ala Asp	
4995 5000 5005	
gtt gac ctg ccg ctt ccg gcc acg ctg atc ttc gat tac ccc act ccg	15126
Val Asp Leu Pro Leu Pro Ala Thr Leu Ile Phe Asp Tyr Pro Thr Pro	
5010 5015 5020	
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Met Ala Leu Cys Gln Phe Leu Arg Ala Ala Ile Val Gly Ala Asp Thr	
5025 5030 5035 5040	
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Gly Thr Thr Thr Arg Leu Pro Leu Thr Ala Val Pro Ala Asp Glu Pro	
5045 5050 5055	
atc gcc atc gtc gcc atg gcc tgt ccg tac ccc ggt gat gta ccg acg	15270
Ile Ala Ile Val Gly Met Ala Cys Arg Tyr Pro Gly Asp Val Arg Thr	
5060 5065 5070	
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Val Asp Asp Leu Trp Gln Val Val Ser Gly Gly His Asp Ala Ile Gly	
5075 5080 5085	
gga ttc ccg acg aac cgt ggg tgg gac ctc gac acg ctg tac aac ccg	15366
Gly Phe Pro Thr Asn Arg Gly Trp Asp Leu Asp Thr Leu Tyr Asn Pro	
5090 5095 5100	
gac ccg gac cac cac gga acc agc tac acc ccg agc ggc gga ttc ctt	15414
Asp Pro Asp His His Gly Thr Ser Tyr Thr Arg Ser Gly Gly Phe Leu	
5105 5110 5115 5120	

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gag gca ctg gcg atg gac ccg cag cag cgg ctg ctg ctg gaa aca gcg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ala 5140 5145 5150	15510
tgg gag agc atc gaa cac gcc tgc atc aac ccc gac agc ctc cgt ggc Trp Glu Ser Ile Glu His Ala Cys Ile Asn Pro Asp Ser Leu Arg Gly 5155 5160 5165	15558
aca cca acc ggc gtc ttc gcc ggg ctg acc tac cac gac tac gcc gcg Thr Pro Thr Gly Val Phe Ala Gly Leu Thr Tyr His Asp Tyr Ala Ala 5170 5175 5180	15606
cgc ttt ccc aca gct ccg gca ggg ttc gag ggg tat ctc ggg cac gga Arg Phe Pro Thr Ala Pro Ala Gly Phe Glu Gly Tyr Leu Gly His Gly 5185 5190 5195 5200	15654
agc gca ggc agt atc gcc tcg ggt cgt gtc gcc tac gct ctc ggc ctg Ser Ala Gly Ser Ile Ala Ser Gly Arg Val Ala Tyr Ala Leu Gly Leu 5205 5210 5215	15702
gaa ggt ccg gcc ctc aca gtc gac act gcc tgc tct tcg tcc ctg gtc Glu Gly Pro Ala Leu Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val 5220 5225 5230	15750
gct ctg cac ctg gcc tgt cag gcg ctg ccg tcc gcc gag tgt tcc atg Ala Leu His Leu Ala Cys Gln Ala Leu Arg Ser Gly Glu Cys Ser Met 5235 5240 5245	15798
gcc ctc gcg ggt ggc gtc acg gtg atg tca acc ccg gcc ggg ttc gtg Ala Leu Ala Gly Gly Val Thr Val Met Ser Thr Pro Ala Gly Phe Val 5250 5255 5260	15846
gag ttt tcg ccg cag ccg ggc ctg gcc gtg gac ggg ccg tgc aag gcg Glu Phe Ser Arg Gln Arg Gly Leu Ala Val Asp Gly Arg Cys Lys Ala 5265 5270 5275 5280	15894
ttc tcg gca gcg gct gac ggc acc ggc tgg ggt gag ggt gtc gga atg Phe Ser Ala Ala Ala Asp Gly Thr Gly Trp Gly Glu Gly Val Gly Met 5285 5290 5295	15942
ctg ctg gtg gag ccg ctg tcg gac gcg ccg ccg ctc ggt cac cga atc Leu Leu Val Glu Arg Leu Ser Asp Ala Arg Arg Leu Gly His Arg Ile 5300 5305 5310	15990
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ggg ctg acg gcg ccc aac ggg ccg tcc cag gag cgt gtc atc cgc ctg Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Glu Arg Val Ile Arg Leu 5330 5335 5340	16086
gcc ctg gcc aac gcg gac ctg acc ccc gcc gac gtc gat gcg gtg gag Ala Leu Ala Asn Ala Asp Leu Thr Pro Ala Asp Val Asp Ala Val Glu 5345 5350 5355 5360	16134

gcc cac ggc acc ggc acc act ttg ggc gac ccg atc gag gcc cag gcc	16182
Ala His Gly Thr Gly Thr Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala	
5365 5370 5375	
ctc ctc gcc acc tac gga cag gac cgc ccc ggc aac gaa ccg ctg tgg	16230
Leu Leu Ala Thr Tyr Gly Gln Asp Arg Pro Gly Asn Glu Pro Leu Trp	
5380 5385 5390	
ctg ggc tcg atg aag tcg aac atc ggc cac gcg cag gct gcc gca ggt	16278
Leu Gly Ser Met Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala Gly	
5395 5400 5405	
gtg ggc ggg gtc atc aag atg gtg atg gcg ctg cgg aat ggt ctg ctg	16326
Val Gly Gly Val Ile Lys Met Val Met Ala Leu Arg Asn Gly Leu Leu	
5410 5415 5420	
ccg cgg acg ttg cat gtg gat gag ccg tcg ccg cat gtg gac tgg tcc	16374
Pro Arg Thr Leu His Val Asp Glu Pro Ser Pro His Val Asp Trp Ser	
5425 5430 5435 5440	
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Ala Gly Ala Val Gln Leu Leu Thr Glu Thr Val Pro Trp Pro Gly Gly	
5445 5450 5455	
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Glu Gly Arg Leu Arg Arg Ala Gly Val Ser Ser Phe Gly Val Ser Gly	
5460 5465 5470	
acc aac gcc cac gtc atc ctc gaa gaa gca ccc gcc cac aac atc ccg	16518
Thr Asn Ala His Val Ile Leu Glu Glu Ala Pro Ala His Asn Ile Pro	
5475 5480 5485	
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Ser Asp Thr Pro Ala Asp Asp Ala Pro Gly Glu Ala Ala Ala Asp Asp	
5490 5495 5500	
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Val Pro Gly Glu Ala Ala Gly Asp Asp Ala Gly Thr Gly Gly Glu Ala	
5505 5510 5515 5520	
act ggt cct gct gcc ggc agt cca ggg gtg tgg ccg tgg ctg gtg tcg	16662
Thr Gly Pro Ala Ala Gly Ser Pro Gly Val Trp Pro Trp Leu Val Ser	
5525 5530 5535	
gcc aag tcg cag ccg gcc ctg cgc gcc cag gcc cag gcc ctg cac gcc	16710
Ala Lys Ser Gln Pro Ala Leu Arg Ala Gln Ala Gln Ala Leu His Ala	
5540 5545 5550	
cac ctc acc gac cac ccc ggc ctc gac ctc gcc gac gtc ggg tac acc	16758
His Leu Thr Asp His Pro Gly Leu Asp Leu Ala Asp Val Gly Tyr Thr	
5555 5560 5565	
ctc gcc cac gcc cgc gcc gtg ttc gac cac cgc gcc acc ctc atc gcc	16806
Leu Ala His Ala Arg Ala Val Phe Asp His Arg Ala Thr Leu Ile Ala	
5570 5575 5580	
gcc gac cgc gac acc ttc ctg caa gca ctc cag gca ctc gcc gca ggc	16854
Ala Asp Arg Asp Thr Phe Leu Gln Ala Leu Gln Ala Leu Ala Ala Gly	
5585 5590 5595 5600	

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acc ggg gag gcc gca gga aag acc gca ttc atc tgc tcc gga cag ggc Thr Gly Glu Ala Ala Gly Lys Thr Ala Phe Ile Cys Ser Gly Gln Gly 5620 5625 5630	16950
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ttc gcc gcc gca ctc aac gac atc tgc acc cac ctc gac ccc cac ctc Phe Ala Ala Ala Leu Asn Asp Ile Cys Thr His Leu Asp Pro His Leu 5650 5655 5660	17046
gac cac ccc ctc ctc ccc ctc ctc acc cag gac ccc aac acc cag gac Asp His Pro Leu Leu Pro Leu Leu Thr Gln Asp Pro Asn Thr Gln Asp 5665 5670 5675 5680	17094
acc acc acc ctc gaa gaa gcg gcc gca ctg ctc cag cag acc ccg tac Thr Thr Thr Leu Glu Glu Ala Ala Ala Leu Leu Gln Gln Thr Pro Tyr 5685 5690 5695	17142
gcc cag ccc gcc ctc ttc gcc ttc cag gtc gcc ctc cac cgc ctc ctc Ala Gln Pro Ala Leu Phe Ala Phe Gln Val Ala Leu His Arg Leu Leu 5700 5705 5710	17190
acc gac ggc tac cac atc acc ccc cac tac tac gcc gga cac tcc ctc Thr Asp Gly Tyr His Ile Thr Pro His Tyr Tyr Ala Gly His Ser Leu 5715 5720 5725	17238
ggc gaa atc acc gcc gcc cac ctc gcc ggc atc ctc acc ctc acc gac Gly Glu Ile Thr Ala Ala His Leu Ala Gly Ile Leu Thr Leu Thr Asp 5730 5735 5740	17286
gcc acc acc ctc atc acc caa cgc gcc acc ctc atg caa acc atg ccc Ala Thr Thr Leu Ile Thr Gln Arg Ala Thr Leu Met Gln Thr Met Pro 5745 5750 5755 5760	17334
ccc ggc acc atg acc acc ctc cac acc acc ccc cac cac atc acc cac Pro Gly Thr Met Thr Thr Leu His Thr Thr Pro His His Ile Thr His 5765 5770 5775	17382
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ccc acc tcc ctc gtc atc agc ggc acc ccc cac acc gtc caa cac atc Pro Thr Ser Leu Val Ile Ser Gly Thr Pro His Thr Val Gln His Ile 5795 5800 5805	17478
acc acc ctc tgc caa caa caa ggc atc aaa acc aaa acc ctc ccc acc Thr Thr Leu Cys Gln Gln Gln Gly Ile Lys Thr Lys Thr Leu Pro Thr 5810 5815 5820	17526
aaa aac gcc ttc cac tcc ccc cac acc aac ccc atc ctc aac caa ctc Lys Asn Ala Phe His Ser Pro His Thr Asn Pro Ile Leu Asn Gln Leu 5825 5830 5835 5840	17574

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atc acc gcc aac acc cca ccc gac caa ctc ctc acc ccc cac tac tgg Ile Thr Ala Asn Thr Pro Pro Asp Gln Leu Leu Thr Pro His Tyr Trp 5860 5865 5870	17670
acc caa caa gcc cgc aac acc gtc gac tac gcc acc acc acc caa acc Thr Gln Gln Ala Arg Asn Thr Val Asp Tyr Ala Thr Thr Thr Gln Thr 5875 5880 5885	17718
ctc cac caa cac ggc gtc acc acc tac atc gaa ctc gga ccc gac aac Leu His Gln His Gly Val Thr Thr Tyr Ile Glu Leu Gly Pro Asp Asn 5890 5895 5900	17766
acc ctc acc acc ctc acc cac cac aac ctc ccc aac acc ccc acc acc Thr Leu Thr Thr Leu Thr His His Asn Leu Pro Asn Thr Pro Thr Thr 5905 5910 5915 5920	17814
acc ctc acc ctc acc cac ccc cac cac ccc caa acc cac ctc ctc Thr Leu Thr Leu Thr His Pro His His Pro Gln Thr His Leu Leu 5925 5930 5935	17862
acc aac ctc gcc aaa acc acc acc acc tgg cac ccc cac cac tac acc Thr Asn Leu Ala Lys Thr Thr Thr Thr Trp His Pro His His Tyr Thr 5940 5945 5950	17910
cac cac cac aac caa ccc cac acc cac acc cac ctc gac ctc ccc acc His His His Asn Gln Pro His Thr His Thr His Leu Asp Leu Pro Thr 5955 5960 5965	17958
tac ccc ttc caa cac cag cac tac tgg ctc gaa agc aca cag ccg ggt Tyr Pro Phe Gln His Gln His Tyr Trp Leu Glu Ser Thr Gln Pro Gly 5970 5975 5980	18006
gcc gga tcc ggt tcg ggt tcc ggt tcc ggg cgg gca ggg act gcg ggc Ala Gly Ser Gly Ser Gly Ser Gly Ser Gly Arg Ala Gly Thr Ala Gly 5985 5990 5995 6000	18054
ggg acg gca gag gtg gag tcg cgg ttc tgg gac gcg gtg gcc cgc cag Gly Thr Ala Glu Val Glu Ser Arg Phe Trp Asp Ala Val Ala Arg Gln 6005 6010 6015	18102
gac ctg gaa acg gtc gcg acc acg ctc gcc gtg ccc ccc tcc gcc ggc Asp Leu Glu Thr Val Ala Thr Thr Leu Ala Val Pro Pro Ser Ala Gly 6020 6025 6030	18150
ctg gac acg gtg gtg ccc gca ctc tcc gcc tgg cac cgc cac caa cac Leu Asp Thr Val Val Pro Ala Leu Ser Ala Trp His Arg His Gln His 6035 6040 6045	18198
gac caa gcc cgc atc aac acc tgg acc tac cag gaa acc tgg aaa ccc Asp Gln Ala Arg Ile Asn Thr Trp Thr Tyr Gln Glu Thr Trp Lys Pro 6050 6055 6060	18246
ctc acc ctc ccc acc acc cac caa ccc cac caa acc tgg ctc atc gcc Leu Thr Leu Pro Thr Thr His Gln Pro His Gln Thr Trp Leu Ile Ala 6065 6070 6075 6080	18294

0914286 082401

atc ccc gaa acc cag acc cac cac ccc cac atc acc aac atc ctc acc	18342
Ile Pro Glu Thr Gln Thr His His Pro His Ile Thr Asn Ile Leu Thr	
6085 6090 6095	
aac ctc cac cac cac ggc atc acc ccc atc ccc ctc acc ctc aac cac	18390
Asn Leu His His His Gly Ile Thr Pro Ile Pro Leu Thr Leu Asn His	
6100 6105 6110	
acc cac acc aac ccc caa cac ctc cac cac acc cga caa caa gcc caa	18438
Thr His Thr Asn Pro Gln His Leu His His Thr Arg Gln Gln Ala Gln	
6115 6120 6125	
aac cac acc acc gga ccc atc acc ggc ctg ctc tcc ctc ctc gcc ctc	18486
Asn His Thr Thr Gly Pro Ile Thr Gly Leu Leu Ser Leu Leu Ala Leu	
6130 6135 6140	
gac gaa aca ccc cac ccc cac cac ccc cac aca ccc acc ggc acc ctc	18534
Asp Glu Thr Pro His Pro His His Pro His Thr Pro Thr Gly Thr Leu	
6145 6150 6155 6160	
ctc aac ctc acc ctc acc caa acc cac acc caa acc cac cca cca acc	18582
Leu Asn Leu Thr Leu Thr Gln Thr His Thr Gln Thr His Pro Pro Thr	
6165 6170 6175	
ccc ctc tgg tac gcc acc acc aac gcc acc acc acc cac ccc aac gac	18630
Pro Leu Trp Tyr Ala Thr Thr Asn Ala Thr Thr Thr His Pro Asn Asp	
6180 6185 6190	
ccc ctc aca cac ccc acc caa gcc caa acc tgg gga ctc gcc cgc acc	18678
Pro Leu Thr His Pro Thr Gln Ala Gln Thr Trp Gly Leu Ala Arg Thr	
6195 6200 6205	
acc ctc ctc gaa cac ccc acc cac acc gcc gga atc atc gac ctc ccc	18726
Thr Leu Leu Glu His Pro Thr His Thr Ala Gly Ile Ile Asp Leu Pro	
6210 6215 6220	
acc acc ccc acc ccc cac acc ctc cac cac ctc acc caa acc ctc acc	18774
Thr Thr Pro Thr Pro His Thr Leu His His Leu Thr Gln Thr Leu Thr	
6225 6230 6235 6240	
caa ccc cac cac caa acc caa ctc gcc atc cgc acc acc ggc acc cac	18822
Gln Pro His His Gln Thr Gln Leu Ala Ile Arg Thr Thr Gly Thr His	
6245 6250 6255	
acc cgc cgc ctc acc ccc acc acc ctc acc ccc aca cac caa cca ccc	18870
Thr Arg Arg Leu Thr Pro Thr Thr Leu Thr Pro Thr His Gln Pro Pro	
6260 6265 6270	
acc ccc acc ccc cac gga acc acc ctc atc acc ggc gga acc ggc gcc	18918
Thr Pro Thr Pro His Gly Thr Thr Leu Ile Thr Gly Gly Thr Gly Ala	
6275 6280 6285	
ctc gcc acc cac ctc acc cac cac ctc acc acc cac caa ccc acc caa	18966
Leu Ala Thr His Leu Thr His His Leu Thr Thr His Gln Pro Thr Gln	
6290 6295 6300	
cac ctc ctc ctc acc agc cga acc ggc ccc cac acc ccc cac gca caa	19014
His Leu Leu Leu Thr Ser Arg Thr Gly Pro His Thr Pro His Ala Gln	
6305 6310 6315 6320	

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acc tgc gac acc agc aac cca gac caa ctc caa caa ctc ctc aac acc Thr Cys Asp Thr Ser Asn Pro Asp Gln Leu Gln Gln Leu Leu Asn Thr 6340 6345 6350	19110
atc ccc cca caa cac ccc ctc acc acc gtc atc cac acc gca ggc atc Ile Pro Pro Gln His Pro Leu Thr Thr Val Ile His Thr Ala Gly Ile 6355 6360 6365	19158
ctc gac gac gcc acc ctc acc aac ctc acc ccc acc caa ctc aac aac Leu Asp Asp Ala Thr Leu Thr Asn Leu Thr Pro Thr Gln Leu Asn Asn 6370 6375 6380	19206
gtc ctc cgc gcc aaa gcc cac agc gcc cac ctc ctc cac caa ctc acc Val Leu Arg Ala Lys Ala His Ser Ala His Leu Leu His Gln Leu Thr 6385 6390 6395 6400	19254
caa cac acc ccc ctc aac gcc ttc gtc ctc tac tcc tcc gcc gcc gcc Gln His Thr Pro Leu Asn Ala Phe Val Leu Tyr Ser Ser Ala Ala Ala 6405 6410 6415	19302
acc ttc ggc gca ccc ggc caa gcc aac tac gcc gca gcc aac gcc tac Thr Phe Gly Ala Pro Gly Gln Ala Asn Tyr Ala Ala Ala Asn Ala Tyr 6420 6425 6430	19350
ctc gac gcc ctc gcc cac cac cgc cac acc cac cac ctc ccc gcc acc Leu Asp Ala Leu Ala His His Arg His Thr His His Leu Pro Ala Thr 6435 6440 6445	19398
agc atc gcc tgg ggc acc tgg caa gga aac gga ctg gcg act ggt caa Ser Ile Ala Trp Gly Thr Trp Gln Gly Asn Gly Leu Ala Thr Gly Gln 6450 6455 6460	19446
gtc agc gaa cat ctc cgc cgc cgc ggg atg ttc gcc atg ccg ccc gag Val Ser Glu His Leu Arg Arg Arg Gly Met Phe Ala Met Pro Pro Glu 6465 6470 6475 6480	19494
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ctc ctc gtc gcc gat atc gac tgg aag aaa ttg gga ccg gtt ctc tcc Leu Leu Val Ala Asp Ile Asp Trp Lys Lys Leu Gly Pro Val Leu Ser 6500 6505 6510	19590
agc aag tcg tcg gtc ttg ctc gag gac ctt ccc cag gca cag gga act Ser Lys Ser Ser Val Leu Glu Asp Leu Pro Gln Ala Gln Gly Thr 6515 6520 6525	19638
gag gag gcg cgc agt acc gtt gag cag acg gag agc aca aac ctc ccg Glu Glu Ala Arg Ser Thr Val Glu Gln Thr Glu Ser Thr Asn Leu Arg 6530 6535 6540	19686
caa ctc ctc atg ggt cgg tca cgt tcc gag cag gaa gaa gag ctg ctc Gln Leu Leu Met Gly Arg Ser Arg Ser Glu Gln Glu Glu Glu Leu Leu 6545 6550 6555 6560	19734



agc ctc gtc cgc atc cac tcc gcg gca gtg ctc ggg cgc gac gac tcc	19782
Ser Leu Val Arg Ile His Ser Ala Ala Val Leu Gly Arg Asp Asp Ser	
6565 6570 6575	
gag gcc atc ccg ccc ggt cgg ctg ttc agg gat cta ggg ttc gac tcg	19830
Glu Ala Ile Pro Pro Gly Arg Leu Phe Arg Asp Leu Gly Phe Asp Ser	
6580 6585 6590	
ctt gcg gcg gtg gag ctt cgc aac cac ctc gca gca cag acg gag ctg	19878
Leu Ala Ala Val Glu Leu Arg Asn His Leu Ala Ala Gln Thr Glu Leu	
6595 6600 6605	
gct ctg ccg acg act ctc gtc ttc gat tac ccc agc ccc acc aag ctc	19926
Ala Leu Pro Thr Thr Leu Val Phe Asp Tyr Pro Ser Pro Thr Lys Leu	
6610 6615 6620	
gcc caa ttt ctg ctc tcc gag atc gcg gag ttc cag ccc gac aac tca	19974
Ala Gln Phe Leu Leu Ser Glu Ile Ala Glu Phe Gln Pro Asp Asn Ser	
6625 6630 6635 6640	
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Thr Pro Leu Pro Arg Pro Arg Ala Glu Leu Asp Glu Pro Ile Ala Ile	
6645 6650 6655	
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Val Gly Met Ala Cys Arg Phe Pro Gly Gly Val Thr Ser Ala Asp Asp	
6660 6665 6670	
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Phe Trp Asp Leu Ile Ser Ser Glu Gln Asp Ala Ile Gly Gly Phe Pro	
6675 6680 6685	
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Thr Asp Arg Gly Trp Asp Leu Asp Thr Leu Tyr Asp Pro Asp Pro Asp	
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His Pro Gly Thr Cys Tyr Thr Arg Asn Gly Gly Phe Leu Tyr Asp Ala	
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Gly His Phe Asp Ala Glu Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu	
6725 6730 6735	
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Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ala Trp Glu Thr	
6740 6745 6750	
atc gaa cac gcc ggc atc aac ccc cac acc ctc cac ggc acc ccc acc	20358
Ile Glu His Ala Gly Ile Asn Pro His Thr Leu His Gly Thr Pro Thr	
6755 6760 6765	
gga gtc ttc acc ggc acc aac gga cag gac cac gcg gca cac atc cgt	20406
Gly Val Phe Thr Gly Thr Asn Gly Gln Asp His Ala Ala His Ile Arg	
6770 6775 6780	
cag gcc ccg agc ggt acc gag gga ttc gtc ctg acc ggg gca gcc acc	20454
Gln Ala Pro Ser Gly Thr Glu Gly Phe Val Leu Thr Gly Ala Ala Thr	
6785 6790 6795 6800	

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Ser Ile Ala Ser Gly Arg Ile Ser Tyr Ile Leu Gly Leu Glu Gly Pro	
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Ala Val Thr Leu Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His	
6820 6825 6830	
ctc gcc tgc cag tcc ctc agg tcc ggt gaa tgc acc atg gcc ttg gcc	20598
Leu Ala Cys Gln Ser Leu Arg Ser Gly Glu Cys Thr Met Ala Leu Ala	
6835 6840 6845	
ggc ggg gcc acg gtc atg acc acc ccg atc acc ttc acc gaa ttc gcc	20646
Gly Gly Ala Thr Val Met Thr Thr Pro Ile Thr Phe Thr Glu Phe Ala	
6850 6855 6860	
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Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg Cys Lys Ala Phe Ser Ala	
6865 6870 6875 6880	
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Ala Ala Asp Gly Thr Gly Trp Gly Glu Gly Val Gly Met Leu Leu Val	
6885 6890 6895	
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Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val	
6900 6905 6910	
gtg cgt ggc agt gcg gtc aac cag gac ggt gcg agc aac ggt ctg acc	20838
Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr	
6915 6920 6925	
gcg ccc aac ggg ccc tcc cag cag cgc gtc atc cgc cag gcc ctc gcc	20886
Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala	
6930 6935 6940	
aac gcg gac ctg acc ccc gcc gac gtc gat gcg gtg gag gcc cac ggc	20934
Asn Ala Asp Leu Thr Pro Ala Asp Val Asp Ala Val Glu Ala His Gly	
6945 6950 6955 6960	
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Thr Gly Thr Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Ile Leu Ala	
6965 6970 6975	
acc tac gga cag gac cgt ccc ggc aac ggg ccg ttg tgg ctg ggc tcc	21030
Thr Tyr Gly Gln Asp Arg Pro Gly Asn Gly Pro Leu Trp Leu Gly Ser	
6980 6985 6990	
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Val Lys Ser Asn Val Gly His Thr Gln Ala Ala Gly Val Ala Gly	
6995 7000 7005	
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Val Ile Lys Met Val Met Ala Leu Arg His Arg Thr Leu Pro Pro Thr	
7010 7015 7020	
ctc cac gcg gat gag ccg tcg ccg cat gtg gac tgg tcc gcg ggt gcg	21174
Leu His Ala Asp Glu Pro Ser Pro His Val Asp Trp Ser Ala Gly Ala	
7025 7030 7035 7040	

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Val Gln Leu Leu Thr Glu Thr Val Pro Trp Pro Gly Gly Glu Gly Arg	
7045 7050 7055	
ccg cgg cgg gca gga gtg tca tca ttc ggc gtc agc ggc acc aac gcc	21270
Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Val Ser Gly Thr Asn Ala	
7060 7065 7070	
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His Val Ile Leu Glu Glu Ala Pro Ala Asp Asp Val Pro Gly Gly Pro	
7075 7080 7085	
ccc gcc gac gag gat gcc ggt agt ggc gag gag gct gct gcc ggc agt	21366
Pro Ala Asp Glu Asp Ala Gly Ser Gly Glu Glu Ala Ala Gly Ser	
7090 7095 7100	
cct ggg gtg tgg ccg tgg ctg gtg tgc gcc aag tgc cag ccg gcc ctg	21414
Pro Gly Val Trp Pro Trp Leu Val Ser Ala Lys Ser Gln Pro Ala Leu	
7105 7110 7115 7120	
cgc gcc cag gcc cag gcc ctg cac gcc cac ctc acc gac cac ccc ggc	21462
Arg Ala Gln Ala Gln Ala Leu His Ala His Leu Thr Asp His Pro Gly	
7125 7130 7135	
ctc gac ctc gcc gac gtc gga tac acc ctc gcc cac gcc cgc gcc gtg	21510
Leu Asp Leu Ala Asp Val Gly Tyr Thr Leu Ala His Ala Arg Ala Val	
7140 7145 7150	
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Phe Asp His Arg Ala Thr Leu Ile Ala Ala Asp Arg Asp Thr Phe Leu	
7155 7160 7165	
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Gln Ala Leu Gln Ala Leu Ala Ala Gly Glu Pro His Pro Ala Val Ile	
7170 7175 7180	
cac agc agc gcc cca ggc ggg acc ggg acc ggg gag gcc gca gga aag	21654
His Ser Ser Ala Pro Gly Gly Thr Gly Thr Gly Glu Ala Ala Gly Lys	
7185 7190 7195 7200	
acc gca ttc atc tgc tcc gga cag ggc acc caa cgc ccc ggc atg gcc	21702
Thr Ala Phe Ile Cys Ser Gly Gln Gly Thr Gln Arg Pro Gly Met Ala	
7205 7210 7215	
cac ggc ctc tac cac acc cac ccc gtc ttc gcc gcc gca ctc aac gac	21750
His Gly Leu Tyr His Thr His Pro Val Phe Ala Ala Ala Leu Asn Asp	
7220 7225 7230	
atc tgc acc cac ctc gac ccc cac ctc gac cac ccc ctc ctc ccc ctc	21798
Ile Cys Thr His Leu Asp Pro His Leu Asp His Pro Leu Leu Pro Leu	
7235 7240 7245	
ctc acc caa aac gac aac gac aac gac aac gag gac gcg gcc gca ctg	21846
Leu Thr Gln Asn Asp Asn Asp Asn Asp Asn Glu Asp Ala Ala Ala Leu	
7250 7255 7260	
ctc cag cag acc ccg tac gcc cag ccc gcc ctc ttc gcc ttc cag gtc	21894
Leu Gln Gln Thr Pro Tyr Ala Gln Pro Ala Leu Phe Ala Phe Gln Val	
7265 7270 7275 7280	

gcc ctc cac cgc ctc ctc acc gac ggc tac cac atc acc ccc cac tac	21942
Ala Leu His Arg Leu Leu Thr Asp Gly Tyr His Ile Thr Pro His Tyr	
7285 7290 7295	
tac gcc gga cac tcc ctc ggc gaa atc acc gcc gcc cac ctc gcc ggc	21990
Tyr Ala Gly His Ser Leu Gly Glu Ile Thr Ala Ala His Leu Ala Gly	
7300 7305 7310	
atc ctc acc ctc acc gac gcc acc acc ctc atc acc caa cgc gcc acc	22038
Ile Leu Thr Leu Thr Asp Ala Thr Thr Leu Ile Thr Gln Arg Ala Thr	
7315 7320 7325	
ctc atg caa acc atg ccc ccc ggc acc atg acc acc ctc cac acc acc	22086
Leu Met Gln Thr Met Pro Pro Gly Thr Met Thr Thr Leu His Thr Thr	
7330 7335 7340	
cca cac cac atc acc cac cac ctc acc gcc cac gaa aac gac ctc gcc	22134
Pro His His Ile Thr His His Leu Thr Ala His Glu Asn Asp Leu Ala	
7345 7350 7355 7360	
atc gcc gcc atc aac acc ccc acc tcc ctc gtc atc agc ggc acc ccc	22182
Ile Ala Ala Ile Asn Thr Pro Thr Ser Leu Val Ile Ser Gly Thr Pro	
7365 7370 7375	
cac acc gtc caa cac atc acc acc ctc tgc caa caa caa ggc atc aaa	22230
His Thr Val Gln His Ile Thr Thr Leu Cys Gln Gln Gln Gly Ile Lys	
7380 7385 7390	
acc aaa acc ctc ccc acc aac cac gcc ttc cac tcc ccc cac acc aac	22278
Thr Lys Thr Thr Leu Pro Thr Asn His Ala Phe His Ser Pro His Thr Asn	
7395 7400 7405	
ccc atc ctc aac caa ctc cac cag cac acc caa acc ctc acc tac cac	22326
Pro Ile Leu Asn Gln Leu His Gln His Thr Gln Thr Leu Thr Tyr His	
7410 7415 7420	
cca ccc cac acc ccc ctc atc acc gcc aac acc cca ccc gac caa ctc	22374
Pro Pro His Thr Pro Leu Ile Thr Ala Asn Thr Pro Pro Asp Gln Leu	
7425 7430 7435 7440	
ctc acc ccc cac tac tgg acc caa caa gcc cgc aac acc gtc gac tac	22422
Leu Thr Pro His Tyr Trp Thr Gln Gln Ala Arg Asn Thr Val Asp Tyr	
7445 7450 7455	
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Ala Thr Thr Thr Gln Thr Leu His Gln His Gly Val Thr Thr Tyr Ile	
7460 7465 7470	
gaa ctc gga ccc gac aac acc ctc acc acc ctc acc cac cac aac ctc	22518
Glu Leu Gly Pro Asp Asn Thr Leu Thr Thr Leu Thr His His Asn Leu	
7475 7480 7485	
ccc aac acc ccc acc acc acc ctc acc ctc acc cac ccc cac cac cac	22566
Pro Asn Thr Pro Thr Thr Thr Leu Thr Leu Thr His Pro His His His	
7490 7495 7500	
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Pro Gln Thr His Leu Leu Thr Asn Leu Ala Lys Thr Thr Thr Thr Trp	
7505 7510 7515 7520	

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gaa cta ccc agc gcc caa acc agc ccc ggt caa agg cgt tct cgc cgc Glu Leu Pro Ser Ala Gln Thr Ser Pro Gly Gln Arg Arg Ser Arg Arg 7555 7560 7565	22758
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ctg gac acg gtg gtg ccc gca ctc tcc gcc tgg cac cgc cac caa cac Leu Asp Thr Val Val Pro Ala Leu Ser Ala Trp His Arg His Gln His 7605 7610 7615	22902
gac caa gcc cgc atc aac acc tgg acc tac cag gaa acc tgg aaa ccc Asp Gln Ala Arg Ile Asn Thr Trp Thr Tyr Gln Glu Thr Trp Lys Pro 7620 7625 7630	22950
ctc acc ctc ccc acc acc cac caa ccc cac caa acc tgg ctc atc gcc Leu Thr Leu Pro Thr Thr His Gln Pro His Gln Thr Trp Leu Ile Ala 7635 7640 7645	22998
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ctc ctc gcc ctc gac gaa aca ccc cac ccc cac cac ccc cac aca ccc Leu Leu Ala Leu Asp Glu Thr Pro His Pro His His Pro His Thr Pro 7715 7720 7725	23238
acc ggc acc ctc ctc aac ctc acc ctc ccc caa acc cac acc caa acc Thr Gly Thr Leu Leu Asn Leu Thr Leu Pro Gln Thr His Thr Gln Thr 7730 7735 7740	23286
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ctc gcc cgc acc acc ctc ctc gaa cac ccc acc cac acc gcc gga atc Leu Ala Arg Thr Thr Leu Leu Glu His Pro Thr His Thr Ala Gly Ile 7780 7785 7790	23430
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acc gcc acc cac acc cgc cgc ctc acc ccc acc acc ctc acc ccc aca Thr Gly Thr His Thr Arg Arg Leu Thr Pro Thr Thr Leu Thr Pro Thr 7825 7830 7835 7840	23574
cac caa cca ccc acc ccc acc ccc cac gga acc acc ctc atc acc gcc His Gln Pro Pro Thr Pro Thr Pro His Gly Thr Thr Leu Ile Thr Gly 7845 7850 7855	23622
gga acc gcc gcc ctc gcc acc cac ctc acc cac cac ctc acc acc cac Gly Thr Gly Ala Leu Ala Thr His Leu Thr His His Leu Thr Thr His 7860 7865 7870	23670
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ctc acc atc acc acc tgc gac acc agc aac cca gac caa ctc caa caa Leu Thr Ile Thr Thr Cys Asp Thr Ser Asn Pro Asp Gln Leu Gln Gln 7905 7910 7915 7920	23814
ctc ctc aac acc atc ccc cca caa cac ccc ctc acc acc gtc atc cac Leu Leu Asn Thr Ile Pro Pro Gln His Pro Leu Thr Thr Val Ile His 7925 7930 7935	23862
acc gca gcc gtc aat ctc ttc gcc ccc gtg tgc gaa acc gat gcc gaa Thr Ala Gly Val Asn Leu Phe Ala Pro Val Ser Glu Thr Asp Ala Glu 7940 7945 7950	23910
tcc ttc tct tcc gtt acg gca gcg aag gca acg gcc gcg gcg att ctg Ser Phe Ser Ser Val Thr Ala Ala Lys Ala Thr Gly Ala Ala Ile Leu 7955 7960 7965	23958
cat gag ttg ctg ctg gac cat gaa acg ctt gaa cac ttc att ctc ttc His Glu Leu Leu Leu Asp His Glu Thr Leu Glu His Phe Ile Leu Phe 7970 7975 7980	24006
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gcg gcc aac gca tac ctg gac gcg ctc gcg acg cat cgt cag aca cat	24102
Ala Ala Asn Ala Tyr Leu Asp Ala Leu Ala Thr His Arg Gln Thr His	
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Gly Leu Pro Gly Ala Ser Ile Ala Trp Gly Pro Trp Ala Gly Lys Gly	
8020 8025 8030	
atg tgc gcc ggt gat gcg gct cat ggt tac ctg gaa aag cgc ggc att	24198
Met Ser Ala Gly Asp Ala Ala His Gly Tyr Leu Glu Lys Arg Gly Ile	
8035 8040 8045	
ctg ccg atg gag cca cgc atg gcg ctc gcg gca ttc cat cgt gcg ccg	24246
Leu Pro Met Glu Pro Arg Met Ala Leu Ala Phe His Arg Ala Arg	
8050 8055 8060	
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Ala Gln Arg Pro Asn Ser Asn Leu Ile Ile Ala Asp Ile Asp Trp Glu	
8065 8070 8075 8080	
cgc ttc gtc ccc gcc ttc acc gct cga cgc cac agc ccg ctc atc gag	24342
Arg Phe Val Pro Ala Phe Thr Ala Arg Arg His Ser Pro Leu Ile Glu	
8085 8090 8095	
gac att ccg gag gtt ccg caa gcg gct cag gag ctg gaa gca gct gcg	24390
Asp Ile Pro Glu Val Arg Gln Ala Ala Gln Glu Leu Glu Ala Ala Ala	
8100 8105 8110	
tgc acg gca aag acg acc aca gct cag ccg att gcg acg tct ctc cgt	24438
Ser Thr Ala Lys Thr Thr Thr Ala Gln Pro Ile Ala Thr Ser Leu Arg	
8115 8120 8125	
gag cga ttg gcc cga ctg acg tcc tca aag cag aac cag gtg ctg ctc	24486
Glu Arg Leu Ala Arg Leu Thr Ser Ser Lys Gln Asn Gln Val Leu Leu	
8130 8135 8140	
ggc ctg att ccg aca ggc atc tgc acc gtt ctc ggc ctt cgt aat ccg	24534
Gly Leu Ile Arg Thr Gly Ile Cys Thr Val Leu Gly Leu Arg Asn Pro	
8145 8150 8155 8160	
gaa ggc atc gag gac caa cga gcc ttc cgc gac ctc ggc ttc gac tgc	24582
Glu Gly Ile Glu Asp Gln Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser	
8165 8170 8175	
ctg acg tgc gct cag ttc agc aag gaa ctc gcc aag gaa acc gga ctg	24630
Leu Thr Ser Ala Gln Phe Ser Lys Glu Leu Ala Lys Glu Thr Gly Leu	
8180 8185 8190	
cca ctc ccc ccg tcc ctg gtc ttc gac tat ccc acc ccg cag gaa tgt	24678
Pro Leu Pro Pro Ser Leu Val Phe Asp Tyr Pro Thr Pro Gln Glu Cys	
8195 8200 8205	
gct gcc cat ctg cgc aca caa ctc gtc gac cta gac gac gaa gag gac	24726
Ala Ala His Leu Arg Thr Gln Leu Val Asp Leu Asp Asp Glu Glu Asp	
8210 8215 8220	
gcg gca ctg tgc aat gct ctc ccg caa gtg gcc cat ccg cgt acc gtc	24774
Ala Ala Leu Ser Asn Ala Leu Pro Gln Val Ala His Arg Arg Thr Val	
8225 8230 8235 8240	

gag gac gaa ccg atc gcc atc atc ggt atg gca tgt cgc ttc ccc ggc	24822
Glu Asp Glu Pro Ile Ala Ile Ile Gly Met Ala Cys Arg Phe Pro Gly	
8245 8250 8255	
ggc gta cgt tct gcc gac gac ctg tgg gaa ttg ctc gct tcg ggt aag	24870
Gly Val Arg Ser Ala Asp Asp Leu Trp Glu Leu Leu Ala Ser Gly Lys	
8260 8265 8270	
gac gct atc ggc gtc ttc ccg acc gac cgc ggc tgg gac ctg gac acg	24918
Asp Ala Ile Gly Val Phe Pro Thr Asp Arg Gly Trp Asp Leu Asp Thr	
8275 8280 8285	
ctc tac gac ccc gac ccc gac cac ccc ggc acc tgc tac acc cga aac	24966
Leu Tyr Asp Pro Asp Pro Asp His Pro Gly Thr Cys Tyr Thr Arg Asn	
8290 8295 8300	
ggc gga ttc ctc tac ggc gca ggc cac ttc gac gcc gaa ttc ttc ggc	25014
Gly Gly Phe Leu Tyr Gly Ala Gly His Phe Asp Ala Glu Phe Phe Gly	
8305 8310 8315 8320	
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Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu	
8325 8330 8335	
ctc gaa acc gcc tgg gaa acc atc gaa cac gcc ggc atc aac ccc cac	25110
Leu Glu Thr Ala Trp Glu Thr Ile Glu His Ala Gly Ile Asn Pro His	
8340 8345 8350	
acc ctc cac ggc acc ccc acc gga gtc ttc gcc gga atc aac gct caa	25158
Thr Leu His Gly Thr Pro Thr Gly Val Phe Ala Gly Ile Asn Ala Gln	
8355 8360 8365	
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Asp His Ala Ala His Ile Arg Gln Ser Arg Asp Val Glu Thr Ile Glu	
8370 8375 8380	
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Gly Tyr Ala Leu Thr Gly Ser Ser Gly Ser Val Ala Ser Gly Arg Val	
8385 8390 8395 8400	
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Ala Tyr Thr Leu Gly Leu Glu Gly Pro Ala Val Ser Val Asp Thr Ala	
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Cys Ser Ser Ser Leu Val Ala Leu His Trp Ala Ala Gln Ala Leu Arg	
8420 8425 8430	
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Ala Gly Glu Cys Ser Met Ala Leu Ala Gly Gly Val Thr Val Met Ser	
8435 8440 8445	
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Ser Pro Gly Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala	
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Asp Gly Arg Cys Lys Ala Tyr Ser Ala Ala Asp Gly Thr Gly Trp	
8465 8470 8475 8480	



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Arg Asn Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn	
8500 8505 8510	
cag gac ggt gcg agc aac ggt ctg acc gcg ccc aac ggg ccc tcc cag	25638
Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln	
8515 8520 8525	
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Gln Arg Val Ile Arg Gln Ala Leu Ala Asn Ala Gly Leu Thr Pro Ala	
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Asp Val Asp Ala Val Glu Gly His Gly Thr Gly Thr Thr Leu Gly Asp	
8545 8550 8555 8560	
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Pro Ile Glu Ala Gln Ala Leu Leu Ala Ala Tyr Gly Gln His Arg Pro	
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His His Arg Pro Leu Trp Leu Gly Ser Leu Lys Ser Asn Ile Gly His	
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Val Pro Trp Pro Ala Asp Pro Ala Gly Arg Pro Arg His Ala Gly Val	
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8675 8680 8685	
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Ala Pro Ala Leu Pro His Pro Leu Pro Leu Pro Val Pro Val Ser Ala	
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Arg Ser Glu Ala Gly Leu Arg Ala Gln Ala Gln Leu Arg Gln Tyr	
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Val Ala Ala Arg Pro Asp Met Ser Pro Ala Asp Ile Gly Ala Gly Leu	
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Asp Arg Glu Glu Leu Ala Gln Ala Leu Thr Ala Leu Ala Ala Gly Glu	
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Pro His Pro His Ile Thr Thr Gly His Thr Arg Gly Gly Asp Arg Gly	
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Ile Leu His Arg Asp Pro Asp Asp Pro Ala Trp Gln Gln Ala Asp Val	
8835 8840 8845	
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Val Gln Pro Val Leu Phe Ser Ile Met Val Ser Leu Ala Ala Leu Trp	
8850 8855 8860	
cgc tcc tac ggc atc gaa ccc gac gcg gtc ctc ggc cac tcc cag gga	26694
Arg Ser Tyr Gly Ile Glu Pro Asp Ala Val Leu Gly His Ser Gln Gly	
8865 8870 8875 8880	
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Glu Ile Ala Ala Ala His Ile Cys Gly Ala Leu Ser Leu Lys Asp Ala	
8885 8890 8895	
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Ala Lys Thr Val Ala Leu Arg Ser Arg Ala Leu Ala Ala Val Arg Gly	
8900 8905 8910	
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Arg Gly Ala Met Ala Ser Leu Pro Leu Pro Ala Gln Asp Val Gln Gln	
8915 8920 8925	
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Leu Ile Ser Glu Arg Trp Glu Gly Gln Leu Trp Val Ala Ala Leu Asn	
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Gly Pro His Ser Thr Thr Val Ser Gly Asp Thr Lys Ala Val Asp Glu	
8945 8950 8955 8960	

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ctc ctg cac ctg ctg gga gac atc acc ccc cag ccg tcc acc gtg ccg Leu Leu His Leu Leu Gly Asp Ile Thr Pro Gln Pro Ser Thr Val Pro 8995 9000 9005	27078
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cgc acc cac ccc tgg ctc acc gac cac acc gtc gcc ggc atg gtc ctc Arg Thr His Pro Trp Leu Thr Asp His Thr Val Ala Gly Met Val Leu 9185 9190 9195 9200	27654

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Ile Pro His Thr Glu Asp Val Thr Leu Gln Val Thr Val Arg Ala Ala	
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Asp Glu Ser Gly His Arg Ala Leu Ala Ile His Ser Tyr Ser Gly Thr	
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9265 9270 9275 9280	
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Thr His His Ala Asp Thr Asp His Arg Ala Asp Thr His Thr Asp Ala	
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Cys Leu Gly Gly Ser Trp Pro Pro Pro Gly Ala Gln Pro Ile Glu Leu	
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9425 9430 9435 9440	

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1650 1655 1660	
ggg ttt ttc ggg atc agt ccg cgt gag gcg ttg gcg atg gat ccg cag	5040
Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln	
1665 1670 1675 1680	
cag ccg ttg atg ctg gag gtg tcc tgg gag gcg ttg gag ccg gcg ggc	5088
Gln Arg Leu Met Leu Glu Val Ser Trp Glu Ala Leu Glu Arg Ala Gly	
1685 1690 1695	
atc gac ccc gcc acg ttg cgc ggg tcc acc acc ggt gtc ttc gcc ggc	5136
Ile Asp Pro Ala Thr Leu Arg Gly Ser Thr Thr Gly Val Phe Ala Gly	
1700 1705 1710	
atg tgc agt cag gac tac gcc gac ctc gtg cgc ccg gcc acc gag gac	5184
Met Cys Ser Gln Asp Tyr Ala Asp Leu Val Arg Arg Ala Thr Glu Asp	
1715 1720 1725	
ctc gag ggc tac gcc atg acg ggc ctg tcc agc agc gtc aca tcc gga	5232
Leu Glu Gly Tyr Ala Met Thr Gly Leu Ser Ser Ser Val Thr Ser Gly	
1730 1735 1740	
cgc gtc gcc tac acc ctg ggg ctc gag ggt ccg gcg gtg acg gtg gat	5280
Arg Val Ala Tyr Thr Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp	
1745 1750 1755 1760	
acg gcg tgt tcg tcg tcg ttg gtg gcg ctg cat ctg gcg tgt cag gcg	5328
Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Cys Gln Ala	
1765 1770 1775	
ttg agg tcg ggg gag tgt tcg ctg gcg ttg gcg ggg ggt gtg acg gtg	5376
Leu Arg Ser Gly Glu Cys Ser Leu Ala Leu Ala Gly Gly Val Thr Val	
1780 1785 1790	



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atg tcg acg ccg ggt gcg ttt gtg gag ttc tcg cgg cag cgg ggt ctg	5424
Met Ser Thr Pro Gly Ala Phe Val Glu Phe Ser Arg Gln Arg Gly Leu	
1795 1800 1805	
tcg ccg gac ggc cgg tgc aag gcg tac ggg tcg ggg gcc gat ggg gtc	5472
Ser Pro Asp Gly Arg Cys Lys Ala Tyr Gly Ser Gly Ala Asp Gly Val	
1810 1815 1820	
ggc tgg gcc gag ggt gtg ggt gtg ctg ttg gtg gag cgg ctg tcc gag	5520
Gly Trp Ala Glu Gly Val Gly Val Leu Leu Val Glu Arg Leu Ser Glu	
1825 1830 1835 1840	
gct gaa cgt cgt ggt cat cgg gtt ttg gcg gtg gtg cgg ggg agt gcg	5568
Ala Glu Arg Arg Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala	
1845 1850 1855	
gtg aat cag gac ggt gcg tcg aat ggg ttg acg gcg ccg aat ggt ccg	5616
Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro	
1860 1865 1870	
tcg cag cag cgg gtg att cgg cag gcg ttg gcg tgt gcg ggg ttg tcc	5664
Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Cys Ala Gly Leu Ser	
1875 1880 1885	
gtg gcg gat gtg gat gtg gtg gag ggg cac ggg acg ggt acg acg ttg	5712
Val Ala Asp Val Asp Val Val Glu Gly His Gly Thr Gly Thr Thr Leu	
1890 1895 1900	
ggt gat ccg atc gag gcg cag gcg ttg ctc gcc act tat ggg cag ggt	5760
Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Gly	
1905 1910 1915 1920	
cgt tcg ggg gag cgg ccg gtg tgg ttg ggg tcg gtg aag tcg aac atc	5808
Arg Ser Gly Glu Arg Pro Val Trp Leu Gly Ser Val Lys Ser Asn Ile	
1925 1930 1935	
ggg cat gcg cag gct gct gcg ggt gtg gcg ggt gtg atc aag atg gtg	5856
Gly His Ala Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val	
1940 1945 1950	
atg gcg ttg cgg gcg ggg gtg ttg ccg cgg acg ttg cat gtg gat gag	5904
Met Ala Leu Arg Ala Gly Val Leu Pro Arg Thr Leu His Val Asp Glu	
1955 1960 1965	
ccg tcg tcg cag gtg gat tgg tcg agt ggg tcg gtt cgt gtg ttg gcg	5952
Pro Ser Ser Gln Val Asp Trp Ser Ser Gly Ser Val Arg Val Leu Ala	
1970 1975 1980	
gat gag gtg gag tgg ccg ggg gtg gag ggt cgg ctg cgg cgt gcg ggg	6000
Asp Glu Val Glu Trp Pro Gly Val Glu Gly Arg Leu Arg Arg Ala Gly	
1985 1990 1995 2000	
gtg tct gcg ttc ggg gtg agt ggg acg aat gcg cat gtg att ttg gag	6048
Val Ser Ala Phe Gly Val Ser Gly Thr Asn Ala His Val Ile Leu Glu	
2005 2010 2015	
gag gcg tcc ggg ggc gcg gat ggg ggt gcg ggc cgg ctg cag gag ttg	6096
Glu Ala Ser Gly Gly Ala Asp Gly Gly Ala Gly Arg Leu Gln Glu Leu	
2020 2025 2030	

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ggt ccg ggg gtg gtg tcg ggt tcg ggg gtg gtg ccg tgg gtg gtg tcg Gly Pro Gly Val Val Ser Gly Ser Gly Val Val Pro Trp Val Val Ser 2035 2040 2045	6144
gcg cgg tcg gag ttg gcg ttg cgg ggg cag gcg cgt cgg ttg cgt ggg Ala Arg Ser Glu Leu Ala Leu Arg Gly Gln Ala Arg Arg Leu Arg Gly 2050 2055 2060	6192
gtt gtg gcg gtt ggt ggg ggt gcg gat ggt gtg ggg gtg agt ccg gct Val Val Ala Val Gly Gly Gly Ala Asp Gly Val Gly Val Ser Pro Ala 2065 2070 2075 2080	6240
ggg gtc ggg cgg gct ttg gtg tcg gag cgg tcg gtg ttc gag cat cgt Gly Val Gly Arg Ala Leu Val Ser Glu Arg Ser Val Phe Glu His Arg 2085 2090 2095	6288
gcg gtg gtc gtg gcc gag gac cgc gac gag ttc ctg cac gca ctc gac Ala Val Val Val Ala Glu Asp Arg Asp Glu Phe Leu His Ala Leu Asp 2100 2105 2110	6336
gca ctg gcc gag ggg gca ccc acc gcg ggg gtg gta cag ggt gtg gcc Ala Leu Ala Glu Gly Ala Pro Thr Ala Gly Val Val Gln Gly Val Ala 2115 2120 2125	6384
gga ccg gcg gcc gac gga aag atc gcc atg ctg ttc gga gga cag ggc Gly Pro Ala Ala Asp Gly Lys Ile Ala Met Leu Phe Gly Gly Gln Gly 2130 2135 2140	6432
acc cac tgg gaa ggc atg gcg cag gaa ctc ctc ggc tcc tca ccg gtc Thr His Trp Glu Gly Met Ala Gln Glu Leu Leu Gly Ser Ser Pro Val 2145 2150 2155 2160	6480
ttc gcc cag cag atg tcc gac tgc gcc caa gcc ctc gaa ccg tac ctg Phe Ala Gln Gln Met Ser Asp Cys Ala Gln Ala Leu Glu Pro Tyr Leu 2165 2170 2175	6528
gac tgg tct ctc ctc gac gtc ctg cgc ggc gca ccg gac gca ccc cct Asp Trp Ser Leu Leu Asp Val Leu Arg Gly Ala Pro Asp Ala Pro Pro 2180 2185 2190	6576
ctg caa cgc gtc gat gtc gtc cag ccc gtc ctc ttc gcg gtg atg gtc Leu Gln Arg Val Asp Val Val Gln Pro Val Leu Phe Ala Val Met Val 2195 2200 2205	6624
tcg ctg gcg gcg ctc tgg cgc tcg tac ggt gta cac ccg gac gcg gtg Ser Leu Ala Ala Leu Trp Arg Ser Tyr Gly Val His Pro Asp Ala Val 2210 2215 2220	6672
gcc ggg cac tcg cag ggc gag atc gca gcg gcc tac gtc gcc ggt gca Ala Gly His Ser Gln Gly Glu Ile Ala Ala Ala Tyr Val Ala Gly Ala 2225 2230 2235 2240	6720
ctc tcc ctc gac gac gcc gcc cgg gtc acc gcc ctg cgc agc cag gcg Leu Ser Leu Asp Asp Ala Ala Arg Val Thr Ala Leu Arg Ser Gln Ala 2245 2250 2255	6768
ctg gcc gca ctg gcc ggg cag ggg gcg atg gca tcg gtc ggt ctg ccg Leu Ala Ala Leu Ala Gly Gln Gly Ala Met Ala Ser Val Gly Leu Pro 2260 2265 2270	6816

gtc gag aag ctg gag ccg cgt ctt gcg aca tgg ggc gac cgt ctg gtc Val Glu Lys Leu Glu Pro Arg Leu Ala Thr Trp Gly Asp Arg Leu Val 2275 2280 2285	6864
atc gcc gcc gtg aac ggg gcg cgt tgc gcc gtg gtc tcc ggg gag ccg Ile Ala Ala Val Asn Gly Ala Arg Ser Ala Val Val Ser Gly Glu Pro 2290 2295 2300	6912
gaa gcg gtc gac gcc ctg gtg gag gag ctg tca cac gaa gac gta ccg Glu Ala Val Asp Ala Leu Val Glu Glu Leu Ser His Glu Asp Val Pro 2305 2310 2315 2320	6960
gcc cgc agg ctc atg gtc gac tgg gcg tgc cac tcc ccg cag gtc gag Ala Arg Arg Leu Met Val Asp Trp Ala Ser His Ser Pro Gln Val Glu 2325 2330 2335	7008
gcg atc cag ggg cgg ctg ctc gaa ctc ctc gcc ccc atc cgc gcg agg Ala Ile Gln Gly Arg Leu Leu Glu Leu Leu Ala Pro Ile Arg Ala Arg 2340 2345 2350	7056
acc gcc gac gtg ccc ttc tac tcc acc gtc acc gcc gaa cgc atc gac Thr Gly Asp Val Pro Phe Tyr Ser Thr Val Thr Gly Glu Arg Ile Asp 2355 2360 2365	7104
ggc acc gaa ctc gac gcc gac tac tgg tac cgc aac ctg cgc cag gtc Gly Thr Glu Leu Asp Ala Asp Tyr Trp Tyr Arg Asn Leu Arg Gln Val 2370 2375 2380	7152
gtc cgc ttc cgg gac gcg aca cag gcg ctg gtc cgc gcc ggc cac acc Val Arg Phe Arg Asp Ala Thr Gln Ala Leu Val Arg Ala Gly His Thr 2385 2390 2395 2400	7200
gtc ttc atc gag gcg tgc ccg cat ccg gcc gtc gcg gtc ggt gtg cag Val Phe Ile Glu Ala Cys Pro His Pro Ala Val Ala Val Gly Val Gln 2405 2410 2415	7248
gaa acc ctg gac gag atg ggt gac ttg gac agc ctg gtc gtc gga tct Glu Thr Leu Asp Glu Met Gly Asp Leu Asp Ser Leu Val Val Gly Ser 2420 2425 2430	7296
ctg cgc cgg ggc gaa ggc ggc ttg cga cgc ttc ctg atg tcc gtg gcc Leu Arg Arg Gly Glu Gly Gly Leu Arg Arg Phe Leu Met Ser Val Ala 2435 2440 2445	7344
gag ttg ttc gtg ggt ggg gtg gcg gtt gag tgg tcc ggt gtg ttc ggg Glu Leu Phe Val Gly Gly Val Ala Val Glu Trp Ser Gly Val Phe Gly 2450 2455 2460	7392
agt gtt ggt cgc ggg gtc gct ggt ggt tgc ggg gtg gag ctg ccg acg Ser Val Gly Arg Gly Val Ala Gly Gly Cys Gly Val Glu Leu Pro Thr 2465 2470 2475 2480	7440
tat gcg ttc gag cga gag cgc ttt tgg ctg gat gtg gag ggg gcg ccg Tyr Ala Phe Glu Arg Glu Arg Phe Trp Leu Asp Val Glu Gly Ala Pro 2485 2490 2495	7488
cgg ggt tcc ggg gtc tct ggg cag tgg ggt ggt cag ttg tgc gag gcg Arg Gly Ser Gly Val Ser Gly Gln Trp Gly Gly Gln Leu Ser Glu Ala 2500 2505 2510	7536

gtg gac acc gtg cgc ggc ggc atg ctg cgc gac tgc ctc gcc gga ctc Val Asp Thr Val Arg Gly Gly Met Leu Arg Asp Cys Leu Ala Gly Leu 2515 2520 2525	7584
gac ccc gcc gca cag gcc gag acc gtg ctg gac ctg gtc ctt acc cat Asp Pro Ala Ala Gln Ala Glu Thr Val Leu Asp Leu Val Leu Thr His 2530 2535 2540	7632
gcc gcg gcc gtc ctt gga cac ggc acc gcc gat gcg gtg gtg ccc gag Ala Ala Ala Val Leu Gly His Gly Thr Ala Asp Ala Val Val Pro Glu 2545 2550 2555 2560	7680
cgc gcc ttc cgc gac ctc ggt ttc gac tcc ctc acc gcc gtc gaa cta Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu 2565 2570 2575	7728
cgc aac cgc ctc aac acc gcc acg ggc ctg cgc ttc ccg agg acc ctg Arg Asn Arg Leu Asn Thr Ala Thr Gly Leu Arg Phe Pro Arg Thr Leu 2580 2585 2590	7776
gtg ttc gac cat ccc cgc ccg gtg gca ctc gcg gca cac atc cac gag Val Phe Asp His Pro Arg Pro Val Ala Leu Ala Ala His Ile His Glu 2595 2600 2605	7824
cag ctg agc ggc gga agc ccg acc acc ggc act gcc ctt gcc ctt gcc Gln Leu Ser Gly Gly Ser Pro Thr Thr Gly Thr Ala Leu Ala Leu Ala 2610 2615 2620	7872
ctt cgg gcc ccg gca ccg cgt gtg gat gtc gac gag ccg att gcc att Leu Arg Ala Pro Ala Pro Arg Val Asp Val Asp Glu Pro Ile Ala Ile 2625 2630 2635 2640	7920
gtg ggg atg gcg tgc cgt ttt ccg ggg ggt gtg gag tgc gcg gag gat Val Gly Met Ala Cys Arg Phe Pro Gly Gly Val Glu Ser Ala Glu Asp 2645 2650 2655	7968
ttc tgg gag ttg atc gcg tgc ggt ccg gat gcg gtg ggg gag ttt ccg Phe Trp Glu Leu Ile Ala Ser Gly Arg Asp Ala Val Gly Glu Phe Pro 2660 2665 2670	8016
gtc gac ccg ggt tgg gac gtg gag gct ttc tat gat ccg gag ccg ggg Val Asp Arg Gly Trp Asp Val Glu Ala Phe Tyr Asp Pro Glu Pro Gly 2675 2680 2685	8064
cgg gcg ggt acg tcc tac acg ccg tgt ggt ggg ttt ttg cag ggt gcg Arg Ala Gly Thr Ser Tyr Thr Arg Cys Gly Gly Phe Leu Gln Gly Ala 2690 2695 2700	8112
gcg gag ttc gat gcg ggg ttt ttc ggg atc agt ccg cgt gag gcg ttg Ala Glu Phe Asp Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu 2705 2710 2715 2720	8160
gcg atg gat ccg cag cag ccg ttg atg ctg gag gtg tcc tgg gag gcg Ala Met Asp Pro Gln Gln Arg Leu Met Leu Glu Val Ser Trp Glu Ala 2725 2730 2735	8208
ttg gag ccg gcg ggc atc gac ccc gcc acg ctg cac ggg tcc acg acc Leu Glu Arg Ala Gly Ile Asp Pro Ala Thr Leu His Gly Ser Thr Thr 2740 2745 2750	8256

ggt gtc ttc gcc ggc gtc tcg cag cag gac tac gcc gag ctc ctg cgc	8304
Gly Val Phe Ala Gly Val Ser Gln Gln Asp Tyr Ala Glu Leu Leu Arg	
2755 2760 2765	
cgc ggc acc cag gac cac gag ggg tac gcg ctc acc ggc gtc tcc aac	8352
Arg Gly Thr Gln Asp His Glu Gly Tyr Ala Leu Thr Gly Val Ser Asn	
2770 2775 2780	
agc gtc gtc tcc ggg cgg ctt tcc tac acc ttc ggc ttc gag ggt ccg	8400
Ser Val Val Ser Gly Arg Leu Ser Tyr Thr Phe Gly Phe Glu Gly Pro	
2785 2790 2795 2800	
gcg gtg acg gtg gat acg gcg tgt tcg tcg tcg ttg gtg gcg ctg cat	8448
Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His	
2805 2810 2815	
ctg gcg tgt cag gcg ttg agg tcg ggg gag tgt tcg ctg gcg ttg gcg	8496
Leu Ala Cys Gln Ala Leu Arg Ser Gly Glu Cys Ser Leu Ala Leu Ala	
2820 2825 2830	
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Gly Gly Val Thr Val Met Ser Thr Pro Gly Ala Phe Val Glu Phe Ser	
2835 2840 2845	
cgg cag cgg ggt ctg tcg ccg gac ggc cgg tgc aag gcg tac ggg tcg	8592
Arg Gln Arg Gly Leu Ser Pro Asp Gly Arg Cys Lys Ala Tyr Gly Ser	
2850 2855 2860	
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Gly Ala Asp Gly Val Gly Trp Ala Glu Gly Val Gly Val Leu Leu Val	
2865 2870 2875 2880	
gag cgg ctg tcc gag gct gaa cgt cgt ggt cat cgg gtt ttg gcg gtg	8688
Glu Arg Leu Ser Glu Ala Glu Arg Arg Gly His Arg Val Leu Ala Val	
2885 2890 2895	
gtg cgg ggg agt gcg gtg aat cag gac ggt gcg tcg aat ggg ttg acg	8736
Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr	
2900 2905 2910	
gcg ccg aat ggt ccg tcg cag cag cgg gtg att cgg cag gcg ttg gcg	8784
Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala	
2915 2920 2925	
tgt gcg ggg ttg tcc gtg gcg gat gtg gat gtg gtg gag ggg cac ggg	8832
Cys Ala Gly Leu Ser Val Ala Asp Val Asp Val Val Glu Gly His Gly	
2930 2935 2940	
acg ggt acg acg ttg ggt gat ccg atc gag gcg cag gcg ttg ctc gcc	8880
Thr Gly Thr Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala	
2945 2950 2955 2960	
acg tac ggg cag ggt cgt tcg ggg gag cgg ccg gtg tgg ttg ggg tcg	8928
Thr Tyr Gly Gln Gly Arg Ser Gly Glu Arg Pro Val Trp Leu Gly Ser	
2965 2970 2975	
gtg aag tcg aac atc ggg cat gcg cag gct gcc gcg ggt gtg gcc ggt	8976
Val Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala Gly Val Ala Gly	
2980 2985 2990	

gtg atc aag atg gtc atg gcc ctg aac cac gaa ctg ttg ccg acc agc	9024
Val Ile Lys Met Val Met Ala Leu Asn His Glu Leu Leu Pro Thr Ser	
2995 3000 3005	
ctg cac atc gac gaa ccc tcc ccc cac atc gac tgg tcg agc ggc ggc	9072
Leu His Ile Asp Glu Pro Ser Pro His Ile Asp Trp Ser Ser Gly Gly	
3010 3015 3020	
gtc cgg ctt ctc acc gag ccc gta ccg tgg cag cag aac ggc cgg ccc	9120
Val Arg Leu Leu Thr Glu Pro Val Pro Trp Gln Gln Asn Gly Arg Pro	
3025 3030 3035 3040	
agg cgc gcg ggc gtc tcc gcg ttc gga gtc agc ggg acc aac gcc cac	9168
Arg Arg Ala Gly Val Ser Ala Phe Gly Val Ser Gly Thr Asn Ala His	
3045 3050 3055	
gtc atc atc gag cag gcg ccg gtc gag gcg cac gtc atc agt gag ccg	9216
Val Ile Ile Glu Gln Ala Pro Val Glu Ala His Val Ile Ser Glu Pro	
3060 3065 3070	
gta ccg gct gag gcg cac gtc atc gtc gag cag gcg ccg gtc gag gcg	9264
Val Pro Ala Glu Ala His Val Ile Val Glu Gln Ala Pro Val Glu Ala	
3075 3080 3085	
ccc cac gtg gtc gac gcc acc gga ccg gcg gac ctc acc gag ccg caa	9312
Pro His Val Val Asp Ala Thr Gly Pro Ala Asp Leu Thr Glu Pro Gln	
3090 3095 3100	
gag gag gcg gct gaa ccg gag tgc gtc gct gac gcc gtg acc gag atg	9360
Glu Glu Ala Ala Glu Pro Glu Cys Val Ala Asp Ala Val Thr Glu Met	
3105 3110 3115 3120	
tcg gct gaa ccg gag tgc gtc gcc gac gcc atg tcc gag atg tcg gct	9408
Ser Ala Glu Pro Glu Cys Val Ala Asp Ala Met Ser Glu Met Ser Ala	
3125 3130 3135	
gag tgc gtc gcc gag gcc gtg tcc gac aag tcg gct gaa ccg gag tgc	9456
Glu Cys Val Ala Glu Ala Val Ser Asp Lys Ser Ala Glu Pro Glu Cys	
3140 3145 3150	
gtc gcc gac gcc atg tcc gac aag ccg gcc ctc ctg ccc atc ccg tgg	9504
Val Ala Asp Ala Met Ser Asp Lys Pro Ala Leu Leu Pro Ile Pro Trp	
3155 3160 3165	
ctg ctc tcc gcc aag tcc gag cga gcg ctg ccg ggc cag gcg cga ccg	9552
Leu Leu Ser Ala Lys Ser Glu Arg Ala Leu Arg Gly Gln Ala Arg Arg	
3170 3175 3180	
ttg ccg cag ttc gct gcc agg gca tcc gat gcc ccg ccg gcc gac gtg	9600
Leu Arg Gln Phe Ala Ala Arg Ala Ser Asp Ala Arg Pro Ala Asp Val	
3185 3190 3195 3200	
gcg cac gcc ctg gcg gca cag ccg tcc gtg ttc gat cac ccg gcc gtc	9648
Ala His Ala Leu Ala Ala Gln Arg Ser Val Phe Asp His Arg Ala Val	
3205 3210 3215	
gtc gtg gcc gag gac cgc gac ggc ttc ctt cag gcc ctc gac gcg ctg	9696
Val Val Ala Glu Asp Arg Asp Gly Phe Leu Gln Ala Leu Asp Ala Leu	
3220 3225 3230	

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gcc gag ggc cgg tcg gcg gac ggc ctg atc gaa ggg tcg gtc ggc ccg Ala Glu Gly Arg Ser Ala Asp Gly Leu Ile Glu Gly Ser Val Gly Pro 3235 3240 3245	9744
cgt ggc ggc cac tca ggc cgc cgg cgc gga aag acc gcc atg ctg ttc Arg Gly Gly His Ser Gly Arg Arg Arg Gly Lys Thr Ala Met Leu Phe 3250 3255 3260	9792
gcc gga cag ggc acg caa cgc gtg gga atg ggc cgt cag ctg tat gcg Ala Gly Gln Gly Thr Gln Arg Val Gly Met Gly Arg Gln Leu Tyr Ala 3265 3270 3275 3280	9840
gct cac ccg gcc tac gcg gac gcg ctg gac cag gta ctg gcg gaa ctg Ala His Pro Ala Tyr Ala Asp Ala Leu Asp Gln Val Leu Ala Glu Leu 3285 3290 3295	9888
gac ggt cac ctg gac cag ccc ctg cgc ccg ctg atc cac gcc agt gcg Asp Gly His Leu Asp Gln Pro Leu Arg Pro Leu Ile His Ala Ser Ala 3300 3305 3310	9936
gat ctt gcg gat gtc gcg gat gcc gcg gat gtt ctg gac cgt acg ccg Asp Leu Ala Asp Val Ala Asp Ala Ala Asp Val Leu Asp Arg Thr Arg 3315 3320 3325	9984
tac gcc cag ccg gcg ctg ttc gcc gtc cag gtc gcg ctc ttc ccg cac Tyr Ala Gln Pro Ala Leu Phe Ala Val Gln Val Ala Leu Phe Arg His 3330 3335 3340	10032
ctg gaa cgt ctc ggc gtg cgc gcg gac ttc gtg gcc ggg cac tcg atc Leu Glu Arg Leu Gly Val Arg Ala Asp Phe Val Ala Gly His Ser Ile 3345 3350 3355 3360	10080
ggc gag ctc gcg gcc gcc cac gtc gcc ggg gtg ctt ccc ctg gca gca Gly Glu Leu Ala Ala Ala His Val Ala Gly Val Leu Pro Leu Ala Ala 3365 3370 3375	10128
gcc tgc cgc ctg gtg gcg gcc cgc ggg cgc ctg atg gag cag ctc gca Ala Cys Arg Leu Val Ala Ala Arg Gly Arg Leu Met Glu Gln Leu Ala 3380 3385 3390	10176
cca ggc ggc gcc atg gtc gcc gta cgg gcg agc gaa gcc gag gcg cga Pro Gly Gly Ala Met Val Ala Val Arg Ala Ser Glu Ala Glu Ala Arg 3395 3400 3405	10224
cag gcg ctc gac ggc cgg gaa gcc cgg gtg tcg gtc gcg gcc gtg aac Gln Ala Leu Asp Gly Arg Glu Ala Arg Val Ser Val Ala Ala Val Asn 3410 3415 3420	10272
gga ccc gcc tcg gtg gtg ttc tcc gcc gcc gag gac gag gtg ggg aac Gly Pro Ala Ser Val Val Phe Ser Gly Ala Glu Asp Glu Val Gly Asn 3425 3430 3435 3440	10320
atg gcg gac tgg ttc gcc gag cgc ggg cgg aga gtc aag cgc ctg cga Met Ala Asp Trp Phe Ala Glu Arg Gly Arg Arg Val Lys Arg Leu Arg 3445 3450 3455	10368
acc ggg cat gcc ttc cac tca ccg ctg atg gac ccg atg ctg gag gag Thr Gly His Ala Phe His Ser Pro Leu Met Asp Pro Met Leu Glu Glu 3460 3465 3470	10416

ttc cag cag gtc gcg gcc tcg ctg acc tac agc gaa cca gcc att ccc Phe Gln Gln Val Ala Ala Ser Leu Thr Tyr Ser Glu Pro Ala Ile Pro 3475 3480 3485	10464
atg gtg tcg acg ctc acc ggc gac atc gtg gcg gcg gga gaa ctg agc Met Val Ser Thr Leu Thr Gly Asp Ile Val Ala Ala Gly Glu Leu Ser 3490 3495 3500	10512
gac ccc gag tac tgg gtc cgg cag gta cgg cgg acc gtg cgc ttc ggc Asp Pro Glu Tyr Trp Val Arg Gln Val Arg Arg Thr Val Arg Phe Gly 3505 3510 3515 3520	10560
gac gcg atc agc cgc ctg cac acc gac gga gtc cgc acc ttc atg gaa Asp Ala Ile Ser Arg Leu His Thr Asp Gly Val Arg Thr Phe Met Glu 3525 3530 3535	10608
ctg ggc cca gac ggg acc ctg tcg gca ctg gcc gag gaa tgc cta gag Leu Gly Pro Asp Gly Thr Leu Ser Ala Leu Ala Glu Glu Cys Leu Glu 3540 3545 3550	10656
gcc acc gcc gac agc cac ccc gcc gac gac gac acc ggc acc ccg caa Ala Thr Ala Asp Ser His Pro Ala Asp Asp Asp Thr Gly Thr Pro Gln 3555 3560 3565	10704
gag aac ctg ctc atc ccg ctc cta cgg ccg gac agc ccg gaa ccc ggc Glu Asn Leu Leu Ile Pro Leu Leu Arg Pro Asp Ser Pro Glu Pro Gly 3570 3575 3580	10752
acc ctg ctc acc ggc ttg gcc cgg ctg cat acg cac gga gcg gcg gcg Thr Leu Leu Thr Gly Leu Ala Arg Leu His Thr His Gly Ala Ala Ala 3585 3590 3595 3600	10800
gtc aac tgg ccc gcc gcc ctg ccc gaa cgc gat cga gcc cgc cac ctc Val Asn Trp Pro Ala Ala Leu Pro Glu Arg Asp Arg Ala Arg His Leu 3605 3610 3615	10848
gac ctg ccg acc tac gcc ttc gat cac cac cgc tac tgg gtc gac acc Asp Leu Pro Thr Tyr Ala Phe Asp His His Arg Tyr Trp Val Asp Thr 3620 3625 3630	10896
tcg gcc ggc cac ccg ggg gac ctg tcg gca gcg ggg ctc ggc acc gcc Ser Ala Gly His Pro Gly Asp Leu Ser Ala Ala Gly Leu Gly Thr Ala 3635 3640 3645	10944
ggg cat ccc ctg ctc ggt tcc gcg gtg gca ctg gcc gag tcg cag gaa Gly His Pro Leu Leu Gly Ser Ala Val Ala Leu Ala Glu Ser Gln Glu 3650 3655 3660	10992
ctc ctc ttc acc ggc cgt ctc tcc ctg cgc aca cac ccg tgg ctg gcc Leu Leu Phe Thr Gly Arg Leu Ser Leu Arg Thr His Pro Trp Leu Ala 3665 3670 3675 3680	11040
gac cac gcc atc ttc ggt acc gtc ctg ctg ccc ggc acg gcc atc ctg Asp His Ala Ile Phe Gly Thr Val Leu Leu Pro Gly Thr Ala Ile Leu 3685 3690 3695	11088
gaa ctg gcc gtg cgc gca ggc gac gag gtc gac tgc ggc acc gtc gag Glu Leu Ala Val Arg Ala Gly Asp Glu Val Asp Cys Gly Thr Val Glu 3700 3705 3710	11136



gaa ctc acc ctg cgg aca ccg ctc gtc ctt ccc gaa cag ggc tcg gtg Glu Leu Thr Leu Arg Thr Pro Leu Val Leu Pro Glu Gln Gly Ser Val 3715 3720 3725	11184
atc ctg caa ctc tcc gtc ggg gca ccc cag ggc ccc cag acg ccc gag Ile Leu Gln Leu Ser Val Gly Ala Pro Gln Gly Pro Gln Thr Pro Glu 3730 3735 3740	11232
gag ccc gaa cgg cgc acc ttc gcc ctg tac gcc cgc gaa gac gac gga Glu Pro Glu Arg Arg Thr Phe Ala Leu Tyr Ala Arg Glu Asp Asp Gly 3745 3750 3755 3760	11280
ctg tcg tcc tcg tcc gcg gcg gcg acc ggc acc gag tgg acc tgc cac Leu Ser Ser Ser Ser Ala Ala Ala Thr Gly Thr Glu Trp Thr Cys His 3765 3770 3775	11328
gcc acc ggc gtc ctg acc ggc acc gcc cgg ccc gcg gag gag cac aca Ala Thr Gly Val Leu Thr Gly Thr Ala Arg Pro Ala Glu Glu His Thr 3780 3785 3790	11376
cag gaa ccg tgg ccg ccc gcc gac gca gca ccg gtg gac ctg gac ggc Gln Glu Pro Trp Pro Pro Ala Asp Ala Ala Pro Val Asp Leu Asp Gly 3795 3800 3805	11424
tgg tac gag cag ctg gcc ggc gcc ggc ctg gga tac ggg ccg gtg ttc Trp Tyr Glu Gln Leu Ala Gly Ala Gly Leu Gly Tyr Gly Pro Val Phe 3810 3815 3820	11472
cag ggg ctg cgc gag gtc tgg ccg cgc ggg gac gag gtg ttc gcc gtc Gln Gly Leu Arg Glu Val Trp Arg Arg Gly Asp Glu Val Phe Ala Val 3825 3830 3835 3840	11520
gtc acc ctg ccc gag agc acg gag gga cag gcg gcc gac gcc gcc ccg Val Thr Leu Pro Glu Ser Thr Glu Gly Gln Ala Ala Asp Ala Ala Arg 3845 3850 3855	11568
tac gcc ctg cac ccg gcc ctg ctg gac gcg gca ctg cac ccg gtc gtt Tyr Ala Leu His Pro Ala Leu Leu Asp Ala Ala Leu His Pro Val Val 3860 3865 3870	11616
ctg cgc cac gag ggc gat gcc gcc gcc gac gga cac ggc tgg ctg ccg Leu Arg His Glu Gly Asp Ala Ala Ala Asp Gly His Gly Trp Leu Pro 3875 3880 3885	11664
ttc tcc tgg acc ggc gtc acg gtc gcc gcc tcc ggc gcc tcc acc ctg Phe Ser Trp Thr Gly Val Thr Val Ala Ala Ser Gly Ala Ser Thr Leu 3890 3895 3900	11712
cac gtc cgt ctc acc gtc cgc acg gac gag gac gcg gtc gga ctg ctg His Val Arg Leu Thr Val Arg Thr Asp Glu Asp Ala Val Gly Leu Leu 3905 3910 3915 3920	11760
gcc acc gac gca tcg gga cgc atc gtc atc tcc gcg ggg tcc ctc gcc Ala Thr Asp Ala Ser Gly Arg Ile Val Ile Ser Ala Gly Ser Leu Ala 3925 3930 3935	11808
ttc cgg ccc gtc tcc gcc gag cag ctc cag gcc gcg cgc acc ggc tac Phe Arg Pro Val Ser Ala Glu Gln Leu Gln Ala Ala Arg Thr Gly Tyr 3940 3945 3950	11856

cac gac cac ctc ttc cgc atc gaa tgg cgg ccg ctg cac ctc ccc acc His Asp His Leu Phe Arg Ile Glu Trp Arg Pro Leu His Leu Pro Thr 3955 3960 3965	11904
aca ccg gca cgg aca gcc gac tgg gcc cta atc ggc ccc ggt gcc cgg Thr Pro Ala Arg Thr Ala Asp Trp Ala Leu Ile Gly Pro Gly Ala Arg 3970 3975 3980	11952
cgg acg gcc gcc gtc ctg gag cgc aac ggc gcc tcc tgg cag gcc tac Arg Thr Ala Ala Val Leu Glu Arg Asn Gly Ala Ser Trp Gln Ala Tyr 3985 3990 3995 4000	12000
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ccg ggc atg gtc gtc atc tgc tgc gag ccg gac ggc gca tcc gcc ccc Pro Gly Met Val Val Ile Ser Cys Glu Pro Asp Gly Ala Ser Ala Pro 4020 4025 4030	12096
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gcc acc acc cgc gtc ctc gcc ctg ctc cag gaa tgg gtc gcc gac gaa Ala Thr Thr Arg Val Leu Ala Leu Leu Gln Glu Trp Val Ala Asp Glu 4065 4070 4075 4080	12240
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gcg acc ccc gac gag ccc gtg tcc gac ctc gca cac gcc gcc gtc tgg Ala Thr Pro Asp Glu Pro Val Ser Asp Leu Ala His Ala Ala Val Trp 4100 4105 4110	12336
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gcc gac tgg gac ccg gag gcc acg gtc ctc atc acg ggc ggt acc gcc Ala Asp Trp Asp Pro Glu Ala Thr Val Leu Ile Thr Gly Gly Thr Gly 4180 4185 4190	12576

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cgg cac ctg ctg ctg gcc acc cgc cgc ggc acg gcc gcg gac ggc gcc Arg His Leu Leu Leu Ala Thr Arg Arg Gly Thr Ala Ala Asp Gly Ala 4210 4215 4220	12672
gcc gac ctg gtc gcc gaa ctc gcc ggc ctc ggc gcc gag gcc acg gtc Ala Asp Leu Val Ala Glu Leu Ala Gly Leu Gly Ala Glu Ala Thr Val 4225 4230 4235 4240	12720
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aac ctc gcc ggc acc gac ttc gcg cgc atg gcc cgc ggc ggc ctg ctc Asn Leu Ala Gly Thr Asp Phe Ala Arg Met Ala Arg Gly Gly Leu Leu 4370 4375 4380	13152
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Phe Ala Ala Gly Leu Asn Gly His Arg Asp Val Trp Tyr Val Pro Ala	
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Pro Gly Phe Leu Glu Gly Glu Pro Leu Pro Ser Gly Ile Gly Ala Val	
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Thr Arg Met Phe Ala Asp Ala Ile Val Arg Phe Thr Asp Gly Ala Pro	
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Phe Ala Leu Ala Gly His Ser Ala Gly Gly Trp Phe Val Tyr Ala Val	
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Thr Ser His Leu Glu Arg Leu Gly Val Arg Pro Glu Ala Val Val Thr	
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Met Asp Ala Tyr Leu Pro Asp Asp Gly Ile Ala Pro Val Ala Ser Ala	
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Leu Thr Ser Glu Ile Phe Asp Arg Val Thr Gln Phe Val Asp Val Asp	
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Tyr Thr Arg Leu Val Ala Met Gly Gly Tyr Phe Arg Ile Phe Ser Gly	
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Trp Ser Pro Pro Asp Ile Thr Thr Pro Ala Leu Phe Leu Arg Gly Arg	
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Thr Ala Arg His Val Asp Glu Trp Leu Thr Glu Ile Ala Ser Val Arg	
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Leu Val Ala Ser Gly Gly Asp Ala Ile Gly Glu Phe Pro Ala Gly Arg	
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Gly Trp Asp Leu Glu Gly Leu Phe Asp Ser Asp Pro Asp Arg Ser Gly	
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Thr Ser Tyr Ala Arg Tyr Gly Gly Phe Leu Tyr Glu Ala Gly Glu Phe	
4975 4980 4985 4990	
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Pro Gln Gln Arg Leu Leu Leu Glu Thr Ser Trp Glu Ala Phe Glu Arg	
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Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Cys	
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Gln Ser Leu Arg Ser Gly Glu Cys Thr Leu Ala Leu Ala Gly Gly Val	
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Thr Val Met Ser Thr Pro His Leu Phe Val Glu Phe Ser Arg Gln Arg	
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Gly Leu Ser Val Asp Gly Arg Cys Lys Ser Phe Ala Gly Gly Ala Asp	
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Ser Asp Ala Val Arg Leu Gly His Arg Val Leu Ala Val Leu Arg Gly	
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Gly Pro Ala Gln Glu Arg Val Ile Arg Gln Ala Leu Ala Asn Ala Gly	
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Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly	
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Val Met Ala Leu Arg Glu Gly Val Leu Pro Arg Thr Leu His Val Asp	
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Thr Glu Ala Val Pro Trp Pro Gly Asp Ala Ala Gly Arg Leu Arg Arg	
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Glu Pro Asp Ala Val Leu Gly His Ser Gln Gly Glu Ile Ala Ala Ala	
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His Val Cys Gly Ala Leu Ser Leu Lys Asp Ala Ala Lys Thr Val Ala	
5585 5590 5595	



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Leu Arg Ser Arg Ala Leu Ala Ala Val Arg Gly Arg Gly Gly Met Ala	
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Ser Val Pro Leu Pro Ala Gln Glu Val Glu Gln Leu Ile Gly Glu Arg	
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His Cys Pro His Val Gln Pro Leu Arg Glu Glu Leu Leu Leu Leu	
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Arg Asn Leu His Gln Pro Val Arg Phe Ser Asp Ala Val Gln Ala Leu	
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Ala Asp Asp Gly His Arg Val Phe Val Glu Val Ser Pro His Pro Thr	
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ctc gtc ccc gcc atc gaa gac acc acc gaa gac acc gcc gaa gac gtc	17502
Leu Val Pro Ala Ile Glu Asp Thr Thr Glu Asp Thr Ala Glu Asp Val	
5760 5765 5770	
acc gcg atc ggc agc ctc cgc cgc ggc gac aac gac acc cgc cgc ttc	17550
Thr Ala Ile Gly Ser Leu Arg Arg Gly Asp Asn Asp Thr Arg Arg Phe	
5775 5780 5785 5790	
ctc acc gcc ctc gcc cac acc cac acc acc ggc atc ggc aca ccc acc	17598
Leu Thr Ala Leu Ala His Thr His Thr Thr Gly Ile Gly Thr Pro Thr	
5795 5800 5805	
acc tgg cac cac cac tac acc cac cac cac acc cac ccc cac aac cac	17646
Thr Trp His His His Tyr Thr His His His Thr His Pro His Asn His	
5810 5815 5820	
cac ctc gac ctc ccc act tat ccc ttc caa cgc cag cac tac tgg ctc	17694
His Leu Asp Leu Pro Thr Tyr Pro Phe Gln Arg Gln His Tyr Trp Leu	
5825 5830 5835	

gac gct ccc acg gga gca ggt gac gtc gcc gct gct ggc ttg gag ccg Asp Ala Pro Thr Gly Ala Gly Asp Val Ala Ala Ala Gly Leu Glu Pro 5840 5845 5850	17742
gcc gaa cac cct ctg ctc gcg gca aca gtc caa ctc gca gac acg gac Ala Glu His Pro Leu Leu Ala Ala Thr Val Gln Leu Ala Asp Thr Asp 5855 5860 5865 5870	17790
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ggc gat tac gag gtg ggg ggt gcg gtc ctg ctg tcg ggg tcg gcg ttc Gly Asp Tyr Glu Val Gly Gly Ala Val Leu Leu Ser Gly Ser Ala Phe 5890 5895 5900	17886
gtg gag ctg gcg gtc cag gtt ggc gaa cgc gtg ggc tgc acc cga atc Val Glu Leu Ala Val Gln Val Gly Glu Arg Val Gly Cys Thr Arg Ile 5905 5910 5915	17934
gag caa ctc act gtg cat gcg ccg ctg gtg gtt cct gtg ggt ggg ggt Glu Gln Leu Thr Val His Ala Pro Leu Val Val Pro Val Gly Gly Gly 5920 5925 5930	17982
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ttg gtg agt gtg tat gcg cgg ggt ggg agt gct tgt ggt ggg ggt ggt Leu Val Ser Val Tyr Ala Arg Gly Gly Ser Ala Cys Gly Gly Gly Gly 5955 5960 5965	18078
gcg tcg ggt ggg gtg tgg acg tgt cat gcc tcg ggg gtg ctg gtt gag Ala Ser Gly Gly Val Trp Thr Cys His Ala Ser Gly Val Leu Val Glu 5970 5975 5980	18126
gct gct gct ggt ggt ggt gtg gtg gtg gat ggt ctg gcg ggg gtg tgg Ala Ala Ala Gly Gly Gly Val Val Val Asp Gly Leu Ala Gly Val Trp 5985 5990 5995	18174
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ttg gct ggg gct ggt tgt gtt ttg ggg ccg gtg ttt tcg ggg ctg cgt Leu Ala Gly Ala Gly Cys Val Leu Gly Pro Val Phe Ser Gly Leu Arg 6015 6020 6025 6030	18270
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Val Leu Ala Ala Arg Leu Thr Arg Leu Glu Ser Ser Val Asp Val Pro	
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Leu Val Ser Arg Arg Gly Pro Asp Ala Pro Gly Ala Glu Gly Leu Arg	
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Val Gly Glu Arg Arg Glu Val Val Arg Leu Leu Glu Gly Val Pro Ala	
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Gly Cys Pro Leu Thr Gly Val Val His Ala Ala Gly Val Leu Asp Asp	
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6480 6485 6490	
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Glu Leu Ser Ala Phe Val Leu Phe Ser Ser Ala Ala Gly Ile Leu Gly	
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Ser Ala Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala Ala Leu Asp Ala	
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Leu Ala Tyr Arg Arg Arg Ala Ala Gly Leu Pro Gly Val Ser Leu Ala	
6530 6535 6540	
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Trp Gly Leu Trp Glu Glu Ala Ser Gly Met Thr Gly His Leu Ala Gly	
6545 6550 6555	

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Pro Asp Ala Leu Ala Leu Phe Asp Ala Ala Leu Ala Leu Asp Arg Pro	
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Val Leu Leu Pro Ala Asp Leu Arg Pro Ala Pro Pro Leu Pro Pro Leu	
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Leu Gln Asp Leu Leu Pro Ala Thr Arg Arg Arg Thr Thr Arg Thr Thr	
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Thr Thr Gly Gly Ala Asp Asn Gly Ala Gln Leu His Ala Arg Leu Ala	
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Ser His Ile Ala Thr Val Leu Gly His Thr Thr Pro Asp Thr Ile Pro	
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Pro Asp Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val	
6675 6680 6685	
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Glu Leu Arg Asn Arg Leu Ser Arg Thr Thr Gly Leu Arg Leu Pro Thr	
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Thr Leu Ala Phe Asp His Pro Asn Pro Thr Thr Leu Thr His His Leu	
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His Thr Gln Leu Leu Gly Ser Asp Ser Thr Ala Ser Ile Pro Ala Pro	
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Arg Ala Ala Ala Val Pro Ala Asp Gln Asp Glu Pro Val Ala Ile Ile	
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6785 6790 6795	

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Trp Gly Leu Val Arg Ser Ala Gln Ala Glu His Pro Asp Arg Phe Val	
8080 8085 8090	
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Leu Leu Asp Leu Asp Thr Asp Leu Asp Ser Gly Ala Asp Ala Asp Ala	
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Gly Asn Glu Ala Gly Met Gly Ser Gly Leu Asp Gly Gly Arg Val Ala	
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Ala Val Val Ala Cys Gly Glu Pro Gln Leu Ala Val Arg Gly Glu Arg	
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Val Leu Ala Ala Arg Leu Thr Arg Leu Glu Ser Pro Val Asp Val Ser	
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Gly Arg Glu Val Leu Pro Trp Leu Ser Gly Gly Ser Val Leu Val Thr	
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Gly Gly Thr Gly Val Leu Gly Ala Ala Val Ala Arg His Leu Ala Gly	
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Val Cys Gly Val Arg Asp Leu Leu Leu Val Ser Arg Arg Gly Pro Asp	
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Ala Pro Gly Ala Glu Gly Leu Arg Ala Glu Leu Ala Ala Leu Gly Ala	
8210 8215 8220	
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Glu Val Arg Ile Val Ala Cys Asp Val Gly Glu Arg Arg Glu Val Val	
8225 8230 8235	

091436 032401

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ctg gat gag ctg acg ccg ggt atg gag ctg tcg gcg ttc gtg ctg ttc Leu Asp Glu Leu Thr Arg Gly Met Glu Leu Ser Ala Phe Val Leu Phe 8290 8295 8300	25086
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Ser Leu Val Ala Leu His Trp Ala Ala Gln Ala Leu Arg Ala Gly Glu	
8720 8725 8730	
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Cys Ser Met Ala Leu Ala Gly Gly Val Thr Val Met Ser Ser Pro Gly	
8735 8740 8745 8750	
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Thr Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala Asp Gly Arg	
8755 8760 8765	
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Cys Lys Ala Tyr Ser Ala Ala Ala Asp Gly Thr Gly Trp Ala Glu Gly	
8770 8775 8780	
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Val Gly Met Leu Leu Val Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly	
8785 8790 8795	
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His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly	
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Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val	
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Ile Arg Gln Ala Leu Ala Asn Ala Gly Leu Thr Pro Ala Asp Val Asp	
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Pro Leu Trp Leu Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln Ala	
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Pro Ala Asp Pro Ala Gly Arg Pro Arg His Ala Gly Val Ser Ser Phe	
8945 8950 8955	

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Pro Ser Gly Ser Leu Pro Gln Gly Ser Val Pro Phe Ser Phe Thr Gly	
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Val Thr Leu His Ala Ala Asn Ala Ser Ser Leu Arg Val Arg Leu Ser	
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Val Val Ala Gly Pro Glu Asp Gly Pro Val Asp Gly Pro Val Asp Val	
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tgg gaa gag gcc agc ggg atg acc ggg cat ctg gcc ggc acc gac cac Trp Glu Glu Ala Ser Gly Met Thr Gly His Leu Ala Gly Thr Asp His 10145 10150 10155	30654

cgg cgc atc atc cgt tcc ggt ctg cat ccc atg tcg acc ccg gac gca Arg Arg Ile Ile Arg Ser Gly Leu His Pro Met Ser Thr Pro Asp Ala 10160 10165 10170	30702
ctg gcc ctg ttc gat gcg gcc ctg gct ctg gac cgg ccg gtc ctg ctg Leu Ala Leu Phe Asp Ala Ala Leu Ala Leu Asp Arg Pro Val Leu Leu 10175 10180 10185 10190	30750
ccc gcc gac ctg cgt ccc gcc ccg ccc ctg ccg ccc ctg ctg cag gac Pro Ala Asp Leu Arg Pro Ala Pro Pro Leu Pro Pro Leu Leu Gln Asp 10195 10200 10205	30798
ctc ctg ccc gcc acc cgc cgc cgc acc acc cgc acc acc act acc ggt Leu Leu Pro Ala Thr Arg Arg Arg Thr Thr Arg Thr Thr Thr Thr Gly 10210 10215 10220	30846
ggt gcg gac aac ggc gcc cag ctg cac ggc cgg ctg gcc ggc cag aca Gly Ala Asp Asn Gly Ala Gln Leu His Gly Arg Leu Ala Gly Gln Thr 10225 10230 10235	30894
cac gaa caa cag cac acc acc ctg ctg gcc ctg gtc cgc tcc cac atc His Glu Gln Gln His Thr Thr Leu Leu Ala Leu Val Arg Ser His Ile 10240 10245 10250	30942
gcc acc gtc ctg ggc cac acc acc ccc gac acc atc ccc ccc gac cgc Ala Thr Val Leu Gly His Thr Thr Pro Asp Thr Ile Pro Pro Asp Arg 10255 10260 10265 10270	30990
gcg ttc cgc gac ctg ggc ttc gac tcc ctg acc gcc gtc gaa cta cgc Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg 10275 10280 10285	31038
aac cgg ctg tcc cac acc acc gga ctg cgc ctg ccc acc acc ctg gcc Asn Arg Leu Ser His Thr Thr Gly Leu Arg Leu Pro Thr Thr Leu Ala 10290 10295 10300	31086
ttc gac cac ccc aac ccc acc acc ctg acc cac cac ctg cac aca caa Phe Asp His Pro Asn Pro Thr Thr Leu Thr His His Leu His Thr Gln 10305 10310 10315	31134
ctc gtc agc aag gga ctg acc gcc gcg gcc gag ccg gac gcc gca acg Leu Val Ser Lys Gly Leu Thr Ala Ala Glu Pro Asp Ala Ala Thr 10320 10325 10330	31182
aca ccc ccg ggg ctg ccc tcg ctg ctg tcg gag ctg gag ccg ctg gag Thr Pro Pro Gly Leu Pro Ser Leu Leu Ser Glu Leu Glu Arg Leu Glu 10335 10340 10345 10350	31230
gcg gta gtg ctg tcc tcc acc aca tcc tcc gct gcc ccg ctg gac gac Ala Val Val Leu Ser Ser Thr Thr Ser Ser Ala Ala Pro Leu Asp Asp 10355 10360 10365	31278
ggc gcg cgc acg cgg ctg gcc tcc cga ctg cat tcc ctg gcc cag aag Gly Ala Arg Thr Arg Leu Ala Ser Arg Leu His Ser Leu Ala Gln Lys 10370 10375 10380	31326
ttg aac ggc gac gac acc gcc ccc gac ctg gca gag aca tcg gac gag Leu Asn Gly Asp Asp Thr Ala Pro Asp Leu Ala Glu Thr Ser Asp Glu 10385 10390 10395	31374

gag atg ttc gct ctc atc gac agg gaa gtc gga ttc gaa tct caa tga 31422  
 Glu Met Phe Ala Leu Ile Asp Arg Glu Val Gly Phe Glu Ser Gln  
 10400 10405 10410

<210> 3  
 <211> 3972  
 <212> PRT  
 <213> Streptomyces avermitilis

<400> 3  
 Val Gln Arg Met Asp Gly Gly Glu Glu Pro Arg Pro Ala Ala Gly Glu  
 1 5 10 15  
 Val Leu Gly Val Ala Asp Glu Ala Asp Gly Gly Val Val Phe Val Phe  
 20 25 30  
 Pro Gly Gln Gly Pro Gln Trp Pro Gly Met Gly Arg Glu Leu Leu Asp  
 35 40 45  
 Ala Ser Asp Val Phe Arg Glu Ser Val Arg Ala Cys Glu Ala Ala Phe  
 50 55 60  
 Ala Pro Tyr Val Asp Trp Ser Val Glu Gln Val Leu Arg Asp Ser Pro  
 65 70 75 80  
 Asp Ala Pro Gly Leu Asp Arg Val Asp Val Val Gln Pro Thr Leu Phe  
 85 90 95  
 Ala Val Met Ile Ser Leu Ala Ala Leu Trp Arg Ser Gln Gly Val Glu  
 100 105 110  
 Pro Cys Ala Val Leu Gly His Ser Leu Gly Glu Ile Ala Ala Ala His  
 115 120 125  
 Val Ser Gly Gly Leu Ser Leu Ala Asp Ala Ala Arg Val Val Thr Leu  
 130 135 140  
 Trp Ser Gln Ala Gln Thr Thr Leu Ala Gly Thr Gly Ala Leu Val Ser  
 145 150 155 160  
 Val Ala Ala Thr Pro Asp Glu Leu Leu Pro Arg Ile Ala Pro Trp Thr  
 165 170 175  
 Glu Asp Asn Pro Ala Arg Leu Ala Val Ala Ala Val Asn Gly Pro Arg  
 180 185 190  
 Ser Thr Val Val Ser Gly Ala Arg Glu Ala Val Ala Asp Leu Val Ala  
 195 200 205  
 Asp Leu Thr Ala Ala Gln Val Arg Thr Arg Met Ile Pro Val Asp Val  
 210 215 220  
 Pro Ala His Ser Pro Leu Met Tyr Ala Ile Glu Glu Arg Val Val Ser  
 225 230 235 240  
 Gly Leu Leu Pro Ile Thr Pro Arg Pro Ser Arg Ile Pro Phe His Ser  
 245 250 255  
 Ser Val Thr Gly Gly Arg Leu Asp Thr Arg Glu Leu Asp Ala Ala Tyr  
 260 265 270

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Trp	Tyr	Arg	Asn	Met	Ser	Ser	Thr	Val	Arg	Phe	Glu	Pro	Ala	Ala	Arg	275	280	285
Leu	Leu	Leu	Gln	Gln	Gly	Pro	Lys	Thr	Phe	Val	Glu	Met	Ser	Pro	His	290	295	300
Pro	Val	Leu	Thr	Met	Gly	Leu	Gln	Glu	Leu	Ala	Pro	Asp	Leu	Gly	Asp	305	310	315
Thr	Thr	Gly	Thr	Ala	Asp	Thr	Val	Ile	Met	Gly	Thr	Leu	Arg	Arg	Gly	325	330	335
Gln	Gly	Thr	Leu	Asp	His	Phe	Leu	Thr	Ser	Leu	Ala	Gln	Leu	Arg	Gly	340	345	350
His	Gly	Glu	Thr	Ser	Ala	Thr	Thr	Val	Leu	Ser	Ala	Arg	Leu	Thr	Ala	355	360	365
Leu	Ser	Pro	Thr	Gln	Gln	Gln	Ser	Leu	Leu	Leu	Asp	Leu	Val	Arg	Ala	370	375	380
His	Thr	Met	Ala	Val	Leu	Asn	Asp	Asp	Gly	Asn	Glu	Arg	Thr	Ala	Ser	385	390	395
Asp	Ala	Gly	Pro	Ser	Ala	Ser	Phe	Ala	His	Leu	Gly	Phe	Asp	Ser	Val	405	410	415
Met	Gly	Val	Glu	Leu	Arg	Asn	Arg	Leu	Ser	Lys	Ala	Thr	Gly	Leu	Arg	420	425	430
Leu	Pro	Val	Thr	Leu	Ile	Phe	Asp	His	Thr	Thr	Pro	Ala	Ala	Val	Ala	435	440	445
Ala	Arg	Leu	Arg	Thr	Ala	Ala	Leu	Gly	His	Leu	Asp	Glu	Asp	Thr	Ala	450	455	460
Pro	Val	Pro	Asp	Ser	Pro	Ser	Gly	His	Gly	Gly	Thr	Ala	Ala	Ala	Asp	465	470	475
Asp	Pro	Ile	Ala	Ile	Ile	Gly	Met	Ala	Cys	Arg	Phe	Pro	Gly	Gly	Val	485	490	495
Arg	Ser	Pro	Lys	Asp	Leu	Trp	Glu	Leu	Ala	Ala	Ser	Gly	Gly	Asp	Ala	500	505	510
Ile	Gly	Pro	Phe	Pro	Thr	Asp	Arg	Gly	Trp	Pro	Thr	Glu	Gln	Arg	His	515	520	525
Ala	Gln	Asp	Pro	Thr	Gln	Pro	Gly	Thr	Phe	Tyr	Pro	Gln	Gly	Gly	Gly	530	535	540
Phe	Leu	His	Asp	Ala	Ala	His	Phe	Asp	Ala	Gly	Phe	Phe	Gly	Ile	Ser	545	550	555
Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Leu	Leu	Leu	Glu	565	570	575
Thr	Ser	Trp	Glu	Ala	Phe	Glu	Arg	Ala	Gly	Ile	Asp	Pro	Leu	Ser	Val	580	585	590

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Arg	Gly	Ser	Arg	Thr	Gly	Val	Phe	Ala	Gly	Ala	Leu	Ser	Phe	Asp	Tyr
		595					600					605			
Gly	Pro	Arg	Met	Asp	Thr	Ala	Ser	Ser	Glu	Gly	Ala	Ala	Asp	Val	Glu
	610					615					620				
Gly	His	Ile	Leu	Thr	Gly	Thr	Thr	Gly	Ser	Val	Leu	Ser	Gly	Arg	Ile
	625				630					635					640
Ala	Tyr	Ser	Phe	Gly	Leu	Glu	Gly	Pro	Ala	Ile	Thr	Val	Asp	Thr	Gly
				645					650					655	
Cys	Ser	Ala	Ser	Leu	Val	Thr	Leu	His	Leu	Ala	Cys	Gln	Ser	Leu	Arg
			660					665					670		
Ser	Gly	Glu	Cys	Thr	Leu	Ala	Leu	Ala	Gly	Gly	Val	Ser	Val	Met	Ser
		675					680					685			
Thr	Leu	Gly	Met	Phe	Ile	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ser	Val
	690					695					700				
Asp	Gly	Arg	Cys	Lys	Ala	Tyr	Ser	Ala	Ala	Ala	Asp	Gly	Thr	Gly	Trp
	705				710					715					720
Gly	Glu	Gly	Val	Gly	Met	Leu	Leu	Val	Glu	Arg	Leu	Ser	Asp	Ala	Val
				725					730					735	
Arg	Leu	Gly	His	Arg	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn
			740					745					750		
Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Pro	Ala	Gln
		755					760					765			
Glu	Arg	Val	Ile	Arg	Gln	Ala	Leu	Ala	Asn	Ala	Gly	Leu	Ser	Val	Ala
	770					775					780				
Asp	Val	Asp	Val	Val	Glu	Gly	His	Gly	Thr	Gly	Thr	Thr	Leu	Gly	Asp
	785				790					795					800
Pro	Ile	Glu	Ala	Gln	Ala	Leu	Leu	Ala	Thr	Tyr	Gly	Gln	Arg	Ala	Gly
				805					810					815	
Asp	Arg	Pro	Leu	Trp	Leu	Gly	Ser	Leu	Lys	Ser	Asn	Ile	Gly	His	Thr
			820					825					830		
Met	Ala	Ala	Ala	Gly	Val	Gly	Gly	Val	Ile	Lys	Met	Val	Met	Ala	Leu
			835				840					845			
Arg	Glu	Gly	Val	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Lys	Pro	Ser	Pro
	850					855					860				
Gln	Val	Asp	Trp	Ser	Ala	Gly	Ala	Val	Arg	Leu	Leu	Thr	Glu	Ala	Val
	865				870					875					880
Pro	Trp	Pro	Gly	Asp	Ala	Ala	Gly	Arg	Leu	Arg	Arg	Ala	Gly	Val	Ser
				885					890					895	
Ser	Phe	Gly	Ile	Gly	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Glu	Ala
			900					905					910		

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Pro Ala Ala Gly Gly Cys Val Ala Gly Gly Gly Val Leu Glu Gly Ala  
915 920 925

Pro Gly Leu Ala Ile Ser Val Ala Glu Ser Val Ala Ala Pro Val Ala  
930 935 940

Val Ser Ala Pro Val Ala Glu Ser Val Pro Val Pro Val Pro Val Pro  
945 950 955 960

Val Pro Val Pro Val Ser Ala Arg Ser Glu Ala Gly Leu Arg Ala Gln  
965 970 975

Ala Glu Ala Leu Arg Gln Tyr Val Ala Val Arg Pro Asp Val Ser Leu  
980 985 990

Ala Asp Val Gly Ala Gly Leu Ala Cys Gly Arg Ala Val Leu Glu His  
995 1000 1005

Arg Ala Val Val Leu Ala Ala Asp Arg Glu Glu Leu Val Gln Gly Leu  
1010 1015 1020

Gly Ala Leu Ala Ala Gly Glu Pro Asp Arg Arg Val Thr Thr Gly His  
1025 1030 1035 1040

Ala Pro Gly Gly Asp Arg Gly Gly Val Val Phe Val Phe Pro Gly Gln  
1045 1050 1055

Gly Gly Gln Trp Ala Gly Met Gly Val Arg Leu Leu Ala Ser Ser Pro  
1060 1065 1070

Val Phe Ala Arg Arg Met Gln Ala Cys Glu Glu Ala Leu Ala Pro Trp  
1075 1080 1085

Val Asp Trp Ser Val Val Asp Ile Leu Arg Arg Asp Ala Gly Asp Ala  
1090 1095 1100

Val Trp Glu Arg Ala Asp Val Val Gln Pro Val Leu Phe Ser Val Met  
1105 1110 1115 1120

Val Ser Leu Ala Ala Leu Trp Arg Ser Tyr Gly Ile Glu Pro Asp Ala  
1125 1130 1135

Val Leu Gly His Ser Gln Gly Glu Ile Ala Ala Ala His Val Cys Gly  
1140 1145 1150

Ala Leu Ser Leu Lys Asp Ala Ala Lys Thr Val Ala Leu Arg Ser Arg  
1155 1160 1165

Ala Leu Ala Ala Val Arg Gly Arg Gly Gly Met Ala Ser Val Pro Leu  
1170 1175 1180

Pro Ala Gln Glu Val Glu Gln Leu Ile Gly Glu Arg Trp Ala Gly Arg  
1185 1190 1195 1200

Leu Trp Val Ala Ala Val Asn Gly Pro Arg Ser Thr Ala Val Ser Gly  
1205 1210 1215

Asp Ala Glu Ala Val Asp Glu Val Leu Ala Tyr Cys Ala Gly Thr Gly  
1220 1225 1230

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Val Arg Ala Arg Arg Ile Pro Val Asp Tyr Ala Ser His Cys Pro His	1235	1240	1245
Val Gln Pro Leu Arg Glu Glu Leu Leu Glu Leu Gly Asp Ile Ser	1250	1255	1260
Pro Gln Pro Ser Gly Val Pro Phe Phe Ser Thr Val Glu Gly Thr Trp	1265	1270	1275
Leu Asp Thr Thr Thr Leu Asp Ala Ala Tyr Trp Tyr Arg Asn Leu His	1285	1290	1295
Gln Pro Val Arg Phe Ser Asp Ala Val Gln Ala Leu Ala Asp Asp Gly	1300	1305	1310
His Arg Val Phe Val Glu Val Ser Pro His Pro Thr Leu Val Pro Ala	1315	1320	1325
Ile Glu Asp Thr Thr Glu Asp Thr Ala Glu Asp Val Thr Ala Ile Gly	1330	1335	1340
Ser Leu Arg Arg Gly Asp Asn Asp Thr Arg Arg Phe Leu Thr Ala Leu	1345	1350	1355
Ala His Thr His Thr Thr Gly Ile Gly Thr Pro Thr Thr Trp His His	1365	1370	1375
His Tyr Thr His His His Thr His Pro His Pro His Thr His Leu Asp	1380	1385	1390
Leu Pro Thr Tyr Pro Phe Gln His Gln His Tyr Trp Leu Glu Ser Ser	1395	1400	1405
Gln Pro Gly Ala Gly Ser Gly Ser Gly Ala Gly Ala Gly Ser Gly Ala	1410	1415	1420
Gly Ser Gly Arg Ala Gly Thr Ala Gly Gly Thr Ala Glu Val Glu Ser	1425	1430	1435
Arg Phe Trp Asp Ala Val Ala Arg Gln Asp Leu Glu Thr Val Ala Thr	1445	1450	1455
Thr Leu Ala Val Pro Pro Ser Ala Gly Leu Asp Thr Val Val Pro Ala	1460	1465	1470
Leu Ser Ala Trp His Arg His Gln His Asp Gln Ala Arg Ile Asn Thr	1475	1480	1485
Trp Thr Tyr Gln Glu Thr Trp Lys Pro Leu Thr Leu Pro Thr Thr His	1490	1495	1500
Gln Pro His Gln Thr Trp Leu Ile Ala Ile Pro Glu Thr Gln Thr His	1505	1510	1515
His Pro His Ile Thr Asn Ile Leu Thr Asn Leu His His His Gly Ile	1525	1530	1535
Thr Pro Ile Pro Leu Thr Leu Asn His Thr His Thr Asn Pro Gln His	1540	1545	1550



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Leu His His Thr Leu His His Thr Arg Gln Gln Ala Gln Asn His Thr  
1555 1560 1565

Thr Gly Ala Ile Thr Gly Leu Leu Ser Leu Leu Ala Leu Asp Glu Thr  
1570 1575 1580

Pro His Pro His His Pro His Thr Pro Thr Gly Thr Leu Leu Asn Leu  
1585 1590 1595 1600

Thr Leu Thr Gln Thr His Thr Gln Thr His Pro Pro Thr Pro Leu Trp  
1605 1610 1615

Tyr Ala Thr Thr Asn Ala Thr Thr Thr His Pro Asn Asp Pro Leu Thr  
1620 1625 1630

His Pro Thr Gln Ala Gln Thr Trp Gly Leu Ala Arg Thr Thr Leu Leu  
1635 1640 1645

Glu His Pro Thr His Thr Ala Gly Ile Ile Asp Leu Pro Thr Thr Pro  
1650 1655 1660

Thr Pro His Thr Leu Gln His Leu Thr Gln Thr Leu Thr Gln Pro His  
1665 1670 1675 1680

His Gln Thr Gln Leu Ala Ile Arg Thr Thr Gly Thr His Thr Arg Arg  
1685 1690 1695

Leu Thr Pro Thr Thr Leu Thr Pro Thr His Gln Pro Pro Thr Pro Thr  
1700 1705 1710

Pro His Gly Thr Thr Leu Ile Thr Gly Gly Thr Gly Ala Leu Ala Thr  
1715 1720 1725

His Leu Thr His His Leu Thr Thr His Gln Pro Thr Gln His Leu Leu  
1730 1735 1740

Leu Thr Ser Arg Thr Gly Pro His Thr Pro His Ala Gln His Leu Thr  
1745 1750 1755 1760

Thr Gln Leu Gln Gln Lys Gly Ile His Leu Thr Ile Thr Thr Cys Asp  
1765 1770 1775

Thr Ser Asn Pro Asp Gln Leu Gln Gln Leu Leu Asn Thr Ile Pro Pro  
1780 1785 1790

Gln His Pro Leu Thr Thr Val Ile His Thr Ala Gly Ile Leu Asp Asp  
1795 1800 1805

Ala Thr Leu Thr Asn Leu Thr Pro Thr Gln Leu Asn Asn Val Leu Arg  
1810 1815 1820

Ala Lys Ala His Ser Ala His Leu Leu His Gln Leu Thr Gln His Thr  
1825 1830 1835 1840

Pro Leu Thr Ala Phe Val Leu Tyr Ser Ser Ala Ala Ala Thr Phe Gly  
1845 1850 1855

Ala Pro Gly Gln Ala Asn Tyr Ala Ala Ala Asn Ala Tyr Leu Asp Ala  
1860 1865 1870

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Leu Ala His His Arg His Thr His His Leu Pro Ala Thr Ser Ile Ala  
 1875 1880 1885  
 Trp Gly Thr Trp Gln Gly Asn Gly Leu Ala Asp Ser Asp Lys Ala Arg  
 1890 1895 1900  
 Ala Tyr Leu Asp Arg Arg Gly Phe Arg Pro Met Ser Pro Glu Leu Ala  
 1905 1910 1915 1920  
 Thr Ala Ala Val Thr Gln Ala Ile Ala Asp Thr Glu Arg Pro Tyr Val  
 1925 1930 1935  
 Val Ile Ala Asp Ile Asp Trp Ser Lys Ile Glu His Thr Ser Gln Thr  
 1940 1945 1950  
 Ser Asp Leu Val Ser Ala Ala Arg Glu Arg Glu Pro Ala Val Gln Arg  
 1955 1960 1965  
 Pro Thr Pro Pro Ala Glu Leu His Lys Thr Leu Ala His Gln Thr Ser  
 1970 1975 1980  
 Ala Asp Gln Arg Ala Ala Leu Leu Glu Leu Val Arg Asp His Val Ala  
 1985 1990 1995 2000  
 Ala Val Leu Arg His Ala Asp Pro Lys Ala Ile Ala Pro Asp Gln Ser  
 2005 2010 2015  
 Phe Arg Ala Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Phe Arg Asn  
 2020 2025 2030  
 Leu Leu Ile Lys Ala Thr Gly Leu Arg Leu Pro Val Ser Leu Val Phe  
 2035 2040 2045  
 Asp His Pro Thr Pro Ala Lys Leu Ala Val His Leu Gln Asn Gln Leu  
 2050 2055 2060  
 Arg Gly Thr Ala Ala Glu Ser Ala Pro Ser Ala Ala Val Thr Ala  
 2065 2070 2075 2080  
 Glu Ala Ser Val Thr Glu Pro Ile Ala Ile Val Gly Met Ala Cys Arg  
 2085 2090 2095  
 Phe Pro Gly Gly Val Thr Ser Ala Asp Asp Phe Trp Asp Leu Ile Ser  
 2100 2105 2110  
 Ser Glu Gln Asp Ala Ile Gly Gly Phe Pro Thr Asp Arg Gly Trp Asp  
 2115 2120 2125  
 Leu Asp Thr Leu Tyr Asp Pro Asp Pro Asp His Pro Gly Thr Cys Tyr  
 2130 2135 2140  
 Thr Arg Asn Gly Gly Phe Leu Tyr Asp Ala Gly His Phe Asp Ala Glu  
 2145 2150 2155 2160  
 Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln  
 2165 2170 2175  
 Arg Leu Leu Leu Glu Thr Ala Trp Glu Thr Ile Glu His Ala Gly Ile  
 2180 2185 2190

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Asn	Pro	His	Thr	Leu	His	Gly	Thr	Pro	Thr	Gly	Val	Phe	Thr	Gly	Thr	2195	2200	2205
Asn	Gly	Gln	Asp	Tyr	Ala	Leu	Arg	Val	His	Asn	Ala	Gly	Gln	Ser	Thr	2210	2215	2220
Asp	Gly	Phe	Ala	Leu	Thr	Gly	Thr	Ala	Gly	Ser	Val	Ile	Ser	Gly	Arg	2225	2230	2235
Ile	Ser	Tyr	Thr	Phe	Gly	Phe	Glu	Gly	Pro	Ala	Val	Ser	Val	Asp	Thr	2245	2250	2255
Ala	Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Cys	Gln	Ala	Leu	2260	2265	2270
Arg	Ala	Gly	Glu	Cys	Ser	Met	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val	Met	2275	2280	2285
Ser	Ser	Pro	Gly	Ala	Phe	Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	2290	2295	2300
Ala	Asp	Gly	His	Cys	Lys	Ala	Phe	Ser	Ala	Ala	Ala	Asp	Gly	Thr	Gly	2305	2310	2315
Trp	Gly	Glu	Gly	Val	Gly	Met	Leu	Leu	Val	Glu	Arg	Leu	Ser	Asp	Ala	2325	2330	2335
His	Arg	Asn	Gly	His	Arg	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	2340	2345	2350
Asn	Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Pro	Ser	2355	2360	2365
Gln	Gln	Arg	Val	Ile	Arg	Gln	Ala	Leu	Ala	Asn	Ala	Gly	Leu	Ser	Ala	2370	2375	2380
Gly	Asp	Val	Asp	Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Thr	Leu	Gly	2385	2390	2395
Asp	Pro	Ile	Glu	Ala	Gln	Ala	Leu	Leu	Ala	Thr	Tyr	Gly	Gln	Asp	Arg	2405	2410	2415
Ala	Gly	Glu	Gly	Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Val	Gly	2420	2425	2430
His	Thr	Gln	Ala	Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Met	2435	2440	2445
Ala	Leu	Arg	His	Gly	Leu	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Glu	Pro	2450	2455	2460
Ser	Pro	His	Val	Asp	Trp	Ser	Ala	Gly	Ala	Val	Gln	Leu	Leu	Thr	Glu	2465	2470	2475
Thr	Val	Pro	Trp	Pro	Gly	Gly	Glu	Gly	Arg	Leu	Arg	Arg	Ala	Gly	Val	2485	2490	2495
Ser	Ser	Phe	Gly	Val	Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Glu	2500	2505	2510

Ala Pro Ala Asp Asp Val Pro Gly Gly Pro Pro Ala Gly Glu Gly Asp  
2515 2520 2525

Ala Gly Ser Asp Asp Glu Ala Ala Ala Gly Ser Pro Gly Val Trp Pro  
2530 2535 2540

Trp Leu Val Ser Ala Lys Ser Gln Pro Ala Leu Arg Ala Gln Ala Gln  
2545 2550 2555 2560

Ala Leu His Ala His Leu Thr Asp His Pro Gly Leu Asp Leu Ala Asp  
2565 2570 2575

Val Gly Tyr Thr Leu Ala His Ala Arg Ala Val Phe Asp His Arg Ala  
2580 2585 2590

Thr Leu Ile Ala Ala Asp Arg Asp Thr Phe Leu Gln Ala Leu Gln Ala  
2595 2600 2605

Leu Ala Ala Gly Glu Pro His Pro Ala Val Ile His Ser Ser Ala Pro  
2610 2615 2620

Gly Gly Thr Gly Thr Gly Glu Ala Ala Gly Lys Thr Ala Phe Ile Cys  
2625 2630 2635 2640

Ser Gly Gln Gly Thr Gln Arg Pro Gly Met Ala His Gly Leu Tyr His  
2645 2650 2655

Thr His Pro Val Phe Ala Ala Ala Leu Asn Asp Ile Cys Thr His Leu  
2660 2665 2670

Asp Pro His Leu Asp His Pro Leu Leu Pro Leu Leu Thr Gln Asn Asp  
2675 2680 2685

Asn Asp Asn Glu Asp Ala Ala Ala Leu Leu Gln Gln Thr Arg Tyr Ala  
2690 2695 2700

Gln Pro Ala Leu Phe Ala Phe Gln Val Ala Leu His Arg Leu Leu Thr  
2705 2710 2715 2720

Asp Gly Tyr His Ile Thr Pro His Tyr Tyr Ala Gly His Ser Leu Gly  
2725 2730 2735

Glu Ile Thr Ala Ala His Leu Ala Gly Ile Leu Thr Leu Thr Asp Ala  
2740 2745 2750

Thr Thr Leu Ile Thr Gln Arg Ala Thr Leu Met Gln Thr Met Pro Pro  
2755 2760 2765

Gly Thr Met Thr Thr Leu His Thr Thr Pro His His Ile Thr His His  
2770 2775 2780

Leu Thr Ala His Glu Asn Asp Leu Ala Ile Ala Ala Ile Asn Thr Pro  
2785 2790 2795 2800

Thr Ser Leu Val Ile Ser Gly Thr Pro His Thr Val Gln His Ile Thr  
2805 2810 2815

Thr Leu Cys Gln Gln Gln Gly Ile Lys Thr Lys Thr Leu Pro Thr Asn  
2820 2825 2830

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His Ala Phe His Ser Pro His Thr Asn Pro Ile Leu Asn Gln Leu His  
 2835 2840 2845

Gln His Thr Gln Thr Leu Thr Tyr His Pro Pro His Thr Pro Leu Ile  
 2850 2855 2860

Thr Ala Asn Thr Pro Pro Asp Gln Leu Leu Thr Pro His Tyr Trp Thr  
 2865 2870 2875 2880

Gln Gln Ala Arg Asn Thr Val Asp Tyr Ala Thr Thr Thr Gln Thr Leu  
 2885 2890 2895

His Gln His Gly Val Thr Thr Tyr Ile Glu Leu Gly Pro Asp Asn Thr  
 2900 2905 2910

Leu Thr Thr Leu Thr His His Asn Leu Pro Asn Pro Pro Thr Thr Thr  
 2915 2920 2925

Leu Thr Leu Thr His Pro His His His Pro Gln Thr His Leu Leu Thr  
 2930 2935 2940

Asn Leu Ala Lys Thr Thr Thr Thr Trp His Pro His His Tyr Thr His  
 2945 2950 2955 2960

His Asp Asn Gln Pro His Thr His Thr His Leu Asp Leu Pro Thr Tyr  
 2965 2970 2975

Pro Phe Gln His His His Tyr Trp Leu Glu Ser Thr Gln Pro Gly Ala  
 2980 2985 2990

Gly Asn Val Ser Ala Ala Gly Leu Asp Pro Thr Glu His Pro Leu Leu  
 2995 3000 3005

Gly Ala Thr Leu Glu Leu Ala Thr Asp Gly Gly Ala Leu Leu Ala Gly  
 3010 3015 3020

Arg Leu Ser Leu Arg Ser His Pro Trp Leu Ala Asp His Ala Val Gly  
 3025 3030 3035 3040

Gly Thr Val Leu Leu Ser Gly Ala Thr Phe Leu Glu Leu Ala Leu His  
 3045 3050 3055

Ala Gly Thr Tyr Val Gly Cys Asp Arg Val Asp Glu Leu Thr Leu His  
 3060 3065 3070

Ala Pro Leu Val Val Pro Val Asp Gly Gly Val Ser Val Gln Val Gly  
 3075 3080 3085

Val Ala Ala Ala Asp Gly Glu Gly Arg Arg Leu Val Ser Val Tyr Ala  
 3090 3095 3100

Arg Gly Gly Ser Ala Cys Gly Gly Gly Gly Ala Ser Gly Gly Val Trp  
 3105 3110 3115 3120

Thr Cys His Ala Ser Gly Val Leu Val Glu Ala Ala Ala Gly Gly Val  
 3125 3130 3135

Val Val Asp Gly Leu Ala Gly Val Trp Pro Pro Arg Gly Ala Val Ala  
 3140 3145 3150

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Val Asp Val Asp Gly Val Arg Asp Arg Leu Ala Gly Ala Gly Cys Val  
 3155 3160 3165

Leu Gly Pro Val Phe Ser Gly Leu Arg Ala Val Trp Arg Asp Gly Gly  
 3170 3175 3180

Asp Leu Leu Ala Glu Val Cys Leu Pro Glu Glu Ala Trp Gly Asp Ala  
 3185 3190 3195 3200

Ala Gly Phe Gly Leu His Pro Ala Leu Leu Asp Gly Val Val Gln Pro  
 3205 3210 3215

Leu Ser Val Leu Leu Pro Gly Gly Thr Gly Phe Gly Glu Gly Ala Gly  
 3220 3225 3230

Phe Gly Glu Gly Val Arg Val Pro Ala Val Trp Gly Gly Val Ser Leu  
 3235 3240 3245

His Arg Ala Gly Val Thr Gly Val Arg Val Arg Val Ser Ala Val Gly  
 3250 3255 3260

Arg Gly Gly Gly Arg Glu Ala Val Ser Val Val Val Gly Asp Glu Ala  
 3265 3270 3275 3280

Gly Val Pro Val Ala Ser Val Asp Arg Leu Glu Leu Arg Pro Val Asp  
 3285 3290 3295

Met Gly Gln Leu Arg Ala Val Ser Val Ser Ala Gly Arg Arg Gly Ser  
 3300 3305 3310

Leu Tyr Ala Val Gln Trp Ala Glu Val Gly Pro Val Pro Val Cys Gly  
 3315 3320 3325

Gln Ala Trp Ala Trp His Glu Asp Val Gly Glu Ser Gly Gly Gly Pro  
 3330 3335 3340

Val Pro Gly Val Val Val Leu Arg Cys Pro Asp Ala Gly Ala Gly Gly  
 3345 3350 3355 3360

Gly Gly Gly Gly Gly Gly Gly Gly Gly Val Gly Glu Val Val Gly Gly  
 3365 3370 3375

Val Leu Gly Val Val Gln Gly Trp Leu Gly Leu Glu Arg Phe Ala Gly  
 3380 3385 3390

Ser Arg Leu Val Val Val Thr Arg Gly Ala Val Val Ala Gly Pro Glu  
 3395 3400 3405

Asp Gly Pro Val Asp Val Val Gly Ala Ser Val Trp Gly Leu Val Arg  
 3410 3415 3420

Ser Ala Gln Ala Glu His Pro Asp Arg Phe Val Leu Leu Asp Leu Asp  
 3425 3430 3435 3440

Thr Asp Thr Gly Thr Asp Leu Asp Thr Gly Ala Gly Ala Gly Trp Gly  
 3445 3450 3455

Val Asp Gly Gly Arg Val Ala Ala Val Val Ala Cys Gly Glu Pro Gln  
 3460 3465 3470

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Leu Ala Val Arg Gly Glu Arg Leu Leu Ala Ala Arg Leu Lys Arg Leu  
3475 3480 3485

Glu Ser Ser Gly Asp Val Pro Ala Gln Arg Ser Gly Asp Thr Arg Ala  
3490 3495 3500

Arg Arg Ser Asp Val Pro Ala Gln Arg Ser Gly Gly Val Pro Ala Arg  
3505 3510 3515 3520

Arg Ser Val Asp Val Ser Gly Arg Glu Val Leu Pro Trp Leu Ser Gly  
3525 3530 3535

Gly Ser Val Leu Val Thr Gly Gly Thr Gly Val Leu Gly Ala Ala Val  
3540 3545 3550

Ala Arg His Leu Ala Gly Val Cys Gly Val Arg Asp Leu Leu Leu Val  
3555 3560 3565

Ser Arg Arg Gly Pro Asp Ala Pro Gly Ala Glu Gly Leu Arg Ala Glu  
3570 3575 3580

Leu Ala Ala Leu Gly Ala Glu Val Arg Ile Val Ala Cys Asp Val Gly  
3585 3590 3595 3600

Glu Arg Arg Glu Val Val Arg Leu Leu Glu Gly Val Pro Ala Gly Cys  
3605 3610 3615

Pro Leu Thr Gly Val Val His Ala Ala Gly Val Leu Asp Asp Ala Thr  
3620 3625 3630

Ile Ala Ser Leu Thr Pro Glu Arg Leu Gly Thr Val Phe Ala Ala Lys  
3635 3640 3645

Val Asp Ala Ala Leu Leu Leu Asp Glu Leu Thr Arg Gly Met Glu Leu  
3650 3655 3660

Ser Ala Phe Val Leu Phe Ser Ser Ala Ala Gly Ile Leu Gly Ser Ala  
3665 3670 3675 3680

Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala Ala Leu Asp Ala Leu Ala  
3685 3690 3695

Tyr Arg Arg Arg Ala Ala Gly Leu Pro Gly Val Ser Leu Ala Trp Gly  
3700 3705 3710

Leu Trp Glu Glu Ala Ser Gly Met Thr Gly His Leu Ala Gly Thr Asp  
3715 3720 3725

His Arg Arg Ile Ile Arg Ser Gly Leu His Pro Met Ser Thr Pro Asp  
3730 3735 3740

Ala Leu Ala Leu Phe Asp Ala Ala Leu Ala Leu Asp Arg Pro Val Leu  
3745 3750 3755 3760

Leu Pro Ala Asp Leu Arg Pro Ala Pro Pro Leu Pro Pro Leu Leu Gln  
3765 3770 3775

Asp Leu Leu Pro Ala Thr Arg Arg Arg Thr Thr Arg Thr Thr Thr Thr  
3780 3785 3790

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Gly Gly Ala Asp Asn Gly Ala Gln Leu His Ala Arg Leu Ala Gly Gln  
3795 3800 3805

Thr His Glu Gln Gln His Thr Thr Leu Leu Ala Leu Val Arg Ser His  
3810 3815 3820

Ile Ala Thr Val Leu Gly His Thr Thr Pro Asp Thr Ile Pro Pro Asp  
3825 3830 , 3835 3840

Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu  
3845 3850 3855

Arg Asn Arg Leu Ser Arg Thr Thr Gly Leu Arg Leu Pro Thr Thr Leu  
3860 3865 3870

Ala Phe Asp His Pro Asn Pro Thr Thr Leu Thr His His Leu His Thr  
3875 3880 3885

Gln Leu Gln Pro Gln Pro Asp Asn Ala Val Ala Pro Val Leu Ala Glu  
3890 3895 3900

Leu Asp Lys Leu Glu Ser Ala Leu Ser Ala Leu Asp Lys Thr Asp Ser  
3905 3910 3915 3920

Ala Ser Glu Arg Val Thr Leu Arg Leu Lys Ser Leu Met Leu Arg Trp  
3925 3930 3935

Asn Ala Pro Gln His Pro Thr Ala Glu Ser Ala Asp Asp Asp Glu Lys  
3940 3945 3950

Phe Thr Ser Ala Thr Glu Ala Glu Ile Phe Lys Phe Ile Asp Asn Asp  
3955 3960 3965

Leu Gly Leu Ser  
3970

<210> 4

<211> 6239

<212> PRT

<213> Streptomyces avermitilis

<400> 4

Met Gln Leu Ala Asn Glu Ala Lys Leu Leu Glu Tyr Leu Lys Arg Val  
1 5 10 15

Thr Ala Asp Leu Asp Arg Thr Arg Arg Arg Leu Tyr Glu Val Val Glu  
20 25 30

Arg Glu Gln Glu Pro Ile Ala Ile Val Gly Met Ala Cys Arg Tyr Pro  
35 40 45

Gly Gly Ala Thr Ser Pro Thr Arg Leu Trp His Leu Val Lys Ser Gln  
50 55 60

Thr Asp Ala Ile Gly Glu Phe Pro Thr Asp Arg Gly Trp Asn Leu Glu  
65 70 75 80

Gln Leu Tyr Asp Pro Asp Pro Asp Arg Ser Gly Thr Ser Tyr Thr Arg  
85 90 95



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Ser	Gly	Gly	Phe	Leu	Tyr	Asp	Ala	Gly	Asp	Phe	Asp	Ala	Ala	Phe	Phe	100	105	110
Glu	Leu	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Leu	115	120	125
Leu	Leu	Glu	Thr	Thr	Trp	Glu	Thr	Phe	Glu	Gln	Gly	Gly	Ile	Asp	Pro	130	135	140
Arg	Ser	Met	Arg	Gly	Ser	Arg	Thr	Gly	Val	Phe	Val	Gly	Ile	Asn	Pro	145	150	155
Glu	Asp	Tyr	Thr	Thr	Gly	Tyr	Thr	His	Gln	Pro	Ser	Asn	Ala	Val	Glu	165	170	175
Gly	Tyr	Leu	Leu	Thr	Gly	Ser	Ala	Ala	Ser	Ile	Ala	Ser	Gly	Arg	Ile	180	185	190
Ser	Tyr	Asn	Phe	Gly	Leu	Glu	Gly	Pro	Ala	Ile	Thr	Ile	Asp	Thr	Ala	195	200	205
Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Cys	Gln	Ala	Leu	Arg	210	215	220
Ser	Gly	Glu	Cys	Thr	Met	Ala	Leu	Ala	Gly	Gly	Ala	Ser	Val	Met	Ala	225	230	235
Thr	Pro	Phe	Val	Phe	Thr	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ala	Ala	245	250	255
Asp	Gly	Arg	Cys	Lys	Ala	Phe	Ser	Ala	Ala	Ala	Asp	Gly	Thr	Gly	Trp	260	265	270
Ser	Glu	Gly	Val	Gly	Met	Leu	Leu	Val	Glu	Arg	Leu	Ser	Asp	Ala	Arg	275	280	285
Arg	Asn	Gly	His	Arg	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	290	295	300
Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Arg	Ser	Gln	305	310	315
Val	Lys	Val	Ile	Arg	Gln	Ala	Leu	Ala	Asn	Ala	His	Leu	Ser	Pro	Ala	325	330	335
Asp	Val	Asp	Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Thr	Leu	Gly	Asp	340	345	350
Pro	Ile	Glu	Ala	Gln	Ala	Leu	Val	Glu	Ala	Tyr	Gly	Gln	Asp	Arg	Pro	355	360	365
Asn	Gly	Arg	Pro	Leu	Trp	Leu	Gly	Thr	Leu	Lys	Ser	Asn	Ile	Gly	His	370	375	380
Ser	Met	Ala	Ala	Ala	Gly	Val	Gly	Gly	Val	Ile	Lys	Met	Val	Met	Ala	385	390	395
Leu	Arg	Asn	Gly	Leu	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Glu	Pro	Ser	405	410	415

Pro His Val Asp Trp Ser Ala Gly Ala Val Gln Leu Leu Thr Glu Thr  
420 425 430

Val Pro Trp Pro Gly Gly Glu Gly Arg Leu Arg Arg Ala Gly Val Ser  
435 440 445

Ser Phe Gly Val Ser Gly Thr Asn Ala His Val Ile Leu Glu Glu Ala  
450 455 460

Pro Ala His Asn Ile Pro Ser Asp Thr Pro Ala Asp Asp Val Pro Gly  
465 470 475 480

Glu Ser Ala Ala Asp Glu Asp Ala Gly Ser Gly Asp Glu Ala Ala Ala  
485 490 495

Gly Ser Pro Gly Val Trp Pro Trp Leu Val Ser Ala Lys Ser Gln Pro  
500 505 510

Ala Leu Arg Ala Gln Ala Gln Ala Leu His Ala His Leu Thr Asp His  
515 520 525

Pro Gly Leu Asp Leu Ala Asp Val Gly Tyr Thr Leu Ala His Ala Arg  
530 535 540

Ala Val Phe Asp His Arg Ala Thr Leu Ile Ala Ala Asp Arg Asp Thr  
545 550 555 560

Phe Leu Gln Ala Leu Gln Ala Leu Ala Ala Gly Glu Pro His Pro Ala  
565 570 575

Val Ile His Ser Ser Ala Pro Gly Gly Thr Gly Thr Gly Glu Ala Ala  
580 585 590

Gly Lys Thr Ala Phe Ile Cys Ser Gly Gln Gly Thr Gln Arg Pro Gly  
595 600 605

Met Ala His Gly Leu Tyr His Thr His Pro Val Phe Ala Ala Ala Leu  
610 615 620

Asn Asp Ile Cys Thr His Leu Asp Pro His Leu Asp His Pro Leu Leu  
625 630 635 640

Pro Leu Leu Thr Gln Asp Pro Asn Thr Gln Asp Thr Thr Thr Leu Glu  
645 650 655

Glu Ala Ala Ala Leu Leu Gln Gln Thr Arg Tyr Ala Gln Pro Ala Leu  
660 665 670

Phe Ala Phe Gln Val Ala Leu His Arg Leu Leu Thr Asp Gly Tyr His  
675 680 685

Ile Thr Pro His Tyr Tyr Ala Gly His Ser Leu Gly Glu Ile Thr Ala  
690 695 700

Ala His Leu Ala Gly Ile Leu Thr Leu Thr Asp Ala Thr Thr Leu Ile  
705 710 715 720

Thr Gln Arg Ala Thr Leu Met Gln Thr Met Pro Pro Gly Thr Met Thr  
725 730 735

Thr	Leu	His	Thr	Thr	Pro	His	His	Ile	Thr	His	His	Leu	Thr	Ala	His		
			740					745					750				
Glu	Asn	Asp	Leu	Ala	Ile	Ala	Ala	Ile	Asn	Thr	Pro	Thr	Ser	Leu	Val		
		755					760					765					
Ile	Ser	Gly	Thr	Pro	His	Thr	Val	Gln	His	Ile	Thr	Thr	Leu	Cys	Gln		
	770					775					780						
Gln	Gln	Gly	Ile	Lys	Thr	Lys	Thr	Leu	Pro	Thr	Asn	His	Ala	Phe	His		
785					790					795					800		
Ser	Pro	His	Thr	Asn	Pro	Ile	Leu	Asn	Gln	Leu	His	Gln	His	Thr	Gln		
				805				810						815			
Thr	Leu	Thr	Tyr	His	Pro	Pro	His	Thr	Pro	Leu	Ile	Thr	Ala	Asn	Thr		
			820					825					830				
Pro	Pro	Asp	Gln	Leu	Leu	Thr	Pro	His	Tyr	Trp	Thr	Gln	Gln	Ala	Arg		
		835					840					845					
Asn	Thr	Val	Asp	Tyr	Ala	Thr	Thr	Thr	Gln	Thr	Leu	His	Gln	His	Gly		
	850					855					860						
Val	Thr	Thr	Tyr	Ile	Glu	Leu	Gly	Pro	Asp	Asn	Thr	Leu	Thr	Thr	Leu		
865					870					875					880		
Thr	His	Asp	Asn	Leu	Pro	Asn	Thr	Pro	Thr	Thr	Thr	Leu	Thr	Leu	Thr		
			885					890						895			
His	Pro	His	His	His	Pro	Gln	Thr	His	Leu	Leu	Thr	Asn	Leu	Ala	Lys		
			900					905					910				
Thr	Thr	Thr	Thr	Trp	His	Pro	His	His	Tyr	Thr	His	His	His	Asn	Gln		
		915					920					925					
Pro	His	Thr	His	Thr	His	Leu	Asp	Leu	Pro	Thr	Tyr	Pro	Phe	Gln	His		
	930					935					940						
His	His	Tyr	Trp	Leu	Gln	Pro	Pro	Gly	Lys	Pro	Ser	Asp	Pro	Ser	Pro		
945					950					955					960		
Ser	Glu	Gly	Arg	Glu	Gln	Ala	Thr	Thr	Pro	Ser	Thr	Pro	Leu	Arg	Asp		
				965					970					975			
Val	Leu	Val	Gly	Lys	Ser	Pro	Gln	Glu	Arg	Asp	Glu	Glu	Leu	Leu	Arg		
			980					985					990				
Leu	Val	Arg	Thr	His	Ala	Ala	Ala	Val	Leu	Gly	His	Ala	Thr	Pro	Glu		
	995						1000					1005					
Val	Ile	Val	Pro	Asn	Lys	Ala	Phe	Lys	Glu	Leu	Gly	Phe	Asp	Ser	Leu		
	1010					1015					1020						
Ala	Ala	Ile	Gln	Leu	Arg	Asn	Arg	Leu	Leu	Ala	Asp	Val	Asp	Leu	Pro		
1025					1030					1035					1040		
Leu	Pro	Ala	Thr	Leu	Ile	Phe	Asp	Tyr	Pro	Thr	Pro	Met	Ala	Leu	Cys		
			1045					1050						1055			

Gln Phe Leu Arg Ala Ala Ile Val Gly Ala Asp Thr Gly Thr Thr Thr  
1060 1065 1070

Arg Leu Pro Leu Thr Ala Val Pro Ala Asp Glu Pro Ile Ala Ile Val  
1075 1080 1085

Gly Met Ala Cys Arg Tyr Pro Gly Asp Val Arg Thr Val Asp Asp Leu  
1090 1095 1100

Trp Gln Val Val Ser Gly Gly His Asp Ala Ile Gly Gly Phe Pro Thr  
1105 1110 1115 1120

Asn Arg Gly Trp Asp Leu Asp Thr Leu Tyr Asn Pro Asp Pro Asp His  
1125 1130 1135

His Gly Thr Ser Tyr Thr Arg Ser Gly Gly Phe Leu Tyr Asp Ala Gly  
1140 1145 1150

Asn Phe Asp Pro Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala  
1155 1160 1165

Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ala Trp Glu Ser Ile  
1170 1175 1180

Glu His Ala Cys Ile Asn Pro Asp Ser Leu Arg Gly Thr Pro Thr Gly  
1185 1190 1195 1200

Val Phe Ala Gly Leu Thr Tyr His Asp Tyr Ala Ala Arg Phe Pro Thr  
1205 1210 1215

Ala Pro Ala Gly Phe Glu Gly Tyr Leu Gly His Gly Ser Ala Gly Ser  
1220 1225 1230

Ile Ala Ser Gly Arg Val Ala Tyr Ala Leu Gly Leu Glu Gly Pro Ala  
1235 1240 1245

Leu Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu  
1250 1255 1260

Ala Cys Gln Ala Leu Arg Ser Gly Glu Cys Ser Met Ala Leu Ala Gly  
1265 1270 1275 1280

Gly Val Thr Val Met Ser Thr Pro Ala Gly Phe Val Glu Phe Ser Arg  
1285 1290 1295

Gln Arg Gly Leu Ala Val Asp Gly Arg Cys Lys Ala Phe Ser Ala Ala  
1300 1305 1310

Ala Asp Gly Thr Gly Trp Gly Glu Gly Val Gly Met Leu Leu Val Glu  
1315 1320 1325

Arg Leu Ser Asp Ala Arg Arg Leu Gly His Arg Ile Leu Ala Val Val  
1330 1335 1340

Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala  
1345 1350 1355 1360

Pro Asn Gly Pro Ser Gln Glu Arg Val Ile Arg Leu Ala Leu Ala Asn  
1365 1370 1375

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Ala Asp Leu Thr Pro Ala Asp Val Asp Ala Val Glu Ala His Gly Thr  
1380 1385 1390

Gly Thr Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr  
1395 1400 1405

Tyr Gly Gln Asp Arg Pro Gly Asn Glu Pro Leu Trp Leu Gly Ser Met  
1410 1415 1420

Lys Ser Asn Ile Gly His Ala Gln Ala Ala Gly Val Gly Gly Val  
1425 1430 1435 1440

Ile Lys Met Val Met Ala Leu Arg Asn Gly Leu Leu Pro Arg Thr Leu  
1445 1450 1455

His Val Asp Glu Pro Ser Pro His Val Asp Trp Ser Ala Gly Ala Val  
1460 1465 1470

Gln Leu Leu Thr Glu Thr Val Pro Trp Pro Gly Gly Glu Gly Arg Leu  
1475 1480 1485

Arg Arg Ala Gly Val Ser Ser Phe Gly Val Ser Gly Thr Asn Ala His  
1490 1495 1500

Val Ile Leu Glu Glu Ala Pro Ala His Asn Ile Pro Ser Asp Thr Pro  
1505 1510 1515 1520

Ala Asp Asp Ala Pro Gly Glu Ala Ala Ala Asp Asp Val Pro Gly Glu  
1525 1530 1535

Ala Ala Gly Asp Asp Ala Gly Thr Gly Gly Glu Ala Thr Gly Pro Ala  
1540 1545 1550

Ala Gly Ser Pro Gly Val Trp Pro Trp Leu Val Ser Ala Lys Ser Gln  
1555 1560 1565

Pro Ala Leu Arg Ala Gln Ala Gln Ala Leu His Ala His Leu Thr Asp  
1570 1575 1580

His Pro Gly Leu Asp Leu Ala Asp Val Gly Tyr Thr Leu Ala His Ala  
1585 1590 1595 1600

Arg Ala Val Phe Asp His Arg Ala Thr Leu Ile Ala Ala Asp Arg Asp  
1605 1610 1615

Thr Phe Leu Gln Ala Leu Gln Ala Leu Ala Ala Gly Glu Pro His Pro  
1620 1625 1630

Ala Val Ile His Ser Ser Ala Pro Gly Gly Thr Gly Thr Gly Glu Ala  
1635 1640 1645

Ala Gly Lys Thr Ala Phe Ile Cys Ser Gly Gln Gly Thr Gln Arg Pro  
1650 1655 1660

Gly Met Ala His Gly Leu Tyr His Thr His Pro Val Phe Ala Ala Ala  
1665 1670 1675 1680

Leu Asn Asp Ile Cys Thr His Leu Asp Pro His Leu Asp His Pro Leu  
1685 1690 1695

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Leu Pro Leu Leu Thr Gln Asp Pro Asn Thr Gln Asp Thr Thr Thr Leu  
1700 1705 1710

Glu Glu Ala Ala Ala Leu Leu Gln Gln Thr Pro Tyr Ala Gln Pro Ala  
1715 1720 1725

Leu Phe Ala Phe Gln Val Ala Leu His Arg Leu Leu Thr Asp Gly Tyr  
1730 1735 1740

His Ile Thr Pro His Tyr Tyr Ala Gly His Ser Leu Gly Glu Ile Thr  
1745 1750 1755 1760

Ala Ala His Leu Ala Gly Ile Leu Thr Leu Thr Asp Ala Thr Thr Leu  
1765 1770 1775

Ile Thr Gln Arg Ala Thr Leu Met Gln Thr Met Pro Pro Gly Thr Met  
1780 1785 1790

Thr Thr Leu His Thr Thr Pro His His Ile Thr His His Leu Thr Ala  
1795 1800 1805

His Glu Asn Asp Leu Ala Ile Ala Ala Ile Asn Thr Pro Thr Ser Leu  
1810 1815 1820

Val Ile Ser Gly Thr Pro His Thr Val Gln His Ile Thr Thr Leu Cys  
1825 1830 1835 1840

Gln Gln Gln Gly Ile Lys Thr Lys Thr Leu Pro Thr Lys Asn Ala Phe  
1845 1850 1855

His Ser Pro His Thr Asn Pro Ile Leu Asn Gln Leu His Gln His Thr  
1860 1865 1870

Gln Thr Leu Thr Tyr His Pro Pro His Thr Pro Leu Ile Thr Ala Asn  
1875 1880 1885

Thr Pro Pro Asp Gln Leu Leu Thr Pro His Tyr Trp Thr Gln Gln Ala  
1890 1895 1900

Arg Asn Thr Val Asp Tyr Ala Thr Thr Thr Gln Thr Leu His Gln His  
1905 1910 1915 1920

Gly Val Thr Thr Tyr Ile Glu Leu Gly Pro Asp Asn Thr Leu Thr Thr  
1925 1930 1935

Leu Thr His His Asn Leu Pro Asn Thr Pro Thr Thr Thr Leu Thr Leu  
1940 1945 1950

Thr His Pro His His His Pro Gln Thr His Leu Leu Thr Asn Leu Ala  
1955 1960 1965

Lys Thr Thr Thr Thr Trp His Pro His His Tyr Thr His His His Asn  
1970 1975 1980

Gln Pro His Thr His Thr His Leu Asp Leu Pro Thr Tyr Pro Phe Gln  
1985 1990 1995 2000

His Gln His Tyr Trp Leu Glu Ser Thr Gln Pro Gly Ala Gly Ser Gly  
2005 2010 2015

Ser Gly Ser Gly Ser Gly Arg Ala Gly Thr Ala Gly Gly Thr Ala Glu  
2020 2025 2030

Val Glu Ser Arg Phe Trp Asp Ala Val Ala Arg Gln Asp Leu Glu Thr  
2035 2040 2045

Val Ala Thr Thr Leu Ala Val Pro Pro Ser Ala Gly Leu Asp Thr Val  
2050 2055 2060

Val Pro Ala Leu Ser Ala Trp His Arg His Gln His Asp Gln Ala Arg  
2065 2070 2075 2080

Ile Asn Thr Trp Thr Tyr Gln Glu Thr Trp Lys Pro Leu Thr Leu Pro  
2085 2090 2095

Thr Thr His Gln Pro His Gln Thr Trp Leu Ile Ala Ile Pro Glu Thr  
2100 2105 2110

Gln Thr His His Pro His Ile Thr Asn Ile Leu Thr Asn Leu His His  
2115 2120 2125

His Gly Ile Thr Pro Ile Pro Leu Thr Leu Asn His Thr His Thr Asn  
2130 2135 2140

Pro Gln His Leu His His Thr Arg Gln Gln Ala Gln Asn His Thr Thr  
2145 2150 2155 2160

Gly Pro Ile Thr Gly Leu Leu Ser Leu Leu Ala Leu Asp Glu Thr Pro  
2165 2170 2175

His Pro His His Pro His Thr Pro Thr Gly Thr Leu Leu Asn Leu Thr  
2180 2185 2190

Leu Thr Gln Thr His Thr Gln Thr His Pro Pro Thr Pro Leu Trp Tyr  
2195 2200 2205

Ala Thr Thr Asn Ala Thr Thr Thr His Pro Asn Asp Pro Leu Thr His  
2210 2215 2220

Pro Thr Gln Ala Gln Thr Trp Gly Leu Ala Arg Thr Thr Leu Leu Glu  
2225 2230 2235 2240

His Pro Thr His Thr Ala Gly Ile Ile Asp Leu Pro Thr Thr Pro Thr  
2245 2250 2255

Pro His Thr Leu His His Leu Thr Gln Thr Leu Thr Gln Pro His His  
2260 2265 2270

Gln Thr Gln Leu Ala Ile Arg Thr Thr Gly Thr His Thr Arg Arg Leu  
2275 2280 2285

Thr Pro Thr Thr Leu Thr Pro Thr His Gln Pro Pro Thr Pro Thr Pro  
2290 2295 2300

His Gly Thr Thr Leu Ile Thr Gly Gly Thr Gly Ala Leu Ala Thr His  
2305 2310 2315 2320

Leu Thr His His Leu Thr Thr His Gln Pro Thr Gln His Leu Leu Leu  
2325 2330 2335

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Thr Ser Arg Thr Gly Pro His Thr Pro His Ala Gln His Leu Thr Thr	2340	2345	2350
Gln Leu Gln Gln Lys Gly Ile His Leu Thr Ile Thr Thr Cys Asp Thr	2355	2360	2365
Ser Asn Pro Asp Gln Leu Gln Gln Leu Leu Asn Thr Ile Pro Pro Gln	2370	2375	2380
His Pro Leu Thr Thr Val Ile His Thr Ala Gly Ile Leu Asp Asp Ala	2385	2390	2395
Thr Leu Thr Asn Leu Thr Pro Thr Gln Leu Asn Asn Val Leu Arg Ala	2405	2410	2415
Lys Ala His Ser Ala His Leu Leu His Gln Leu Thr Gln His Thr Pro	2420	2425	2430
Leu Asn Ala Phe Val Leu Tyr Ser Ser Ala Ala Ala Thr Phe Gly Ala	2435	2440	2445
Pro Gly Gln Ala Asn Tyr Ala Ala Ala Asn Ala Tyr Leu Asp Ala Leu	2450	2455	2460
Ala His His Arg His Thr His His Leu Pro Ala Thr Ser Ile Ala Trp	2465	2470	2475
Gly Thr Trp Gln Gly Asn Gly Leu Ala Thr Gly Gln Val Ser Glu His	2485	2490	2495
Leu Arg Arg Arg Gly Met Phe Ala Met Pro Pro Glu Leu Ala Val Thr	2500	2505	2510
Ala Val Asp Gly Ala Ile Ala Ser Gly Arg Pro Ser Leu Leu Val Ala	2515	2520	2525
Asp Ile Asp Trp Lys Lys Leu Gly Pro Val Leu Ser Ser Lys Ser Ser	2530	2535	2540
Val Leu Leu Glu Asp Leu Pro Gln Ala Gln Gly Thr Glu Glu Ala Arg	2545	2550	2555
Ser Thr Val Glu Gln Thr Glu Ser Thr Asn Leu Arg Gln Leu Leu Met	2565	2570	2575
Gly Arg Ser Arg Ser Glu Gln Glu Glu Leu Leu Ser Leu Val Arg	2580	2585	2590
Ile His Ser Ala Ala Val Leu Gly Arg Asp Asp Ser Glu Ala Ile Pro	2595	2600	2605
Pro Gly Arg Leu Phe Arg Asp Leu Gly Phe Asp Ser Leu Ala Ala Val	2610	2615	2620
Glu Leu Arg Asn His Leu Ala Ala Gln Thr Glu Leu Ala Leu Pro Thr	2625	2630	2635
Thr Leu Val Phe Asp Tyr Pro Ser Pro Thr Lys Leu Ala Gln Phe Leu	2645	2650	2655



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Leu Ser Glu Ile Ala Glu Phe Gln Pro Asp Asn Ser Thr Pro Leu Pro  
2660 2665 2670

Arg Pro Arg Ala Glu Leu Asp Glu Pro Ile Ala Ile Val Gly Met Ala  
2675 2680 2685

Cys Arg Phe Pro Gly Gly Val Thr Ser Ala Asp Asp Phe Trp Asp Leu  
2690 2695 2700

Ile Ser Ser Glu Gln Asp Ala Ile Gly Gly Phe Pro Thr Asp Arg Gly  
2705 2710 2715 2720

Trp Asp Leu Asp Thr Leu Tyr Asp Pro Asp Pro Asp His Pro Gly Thr  
2725 2730 2735

Cys Tyr Thr Arg Asn Gly Gly Phe Leu Tyr Asp Ala Gly His Phe Asp  
2740 2745 2750

Ala Glu Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro  
2755 2760 2765

Gln Gln Arg Leu Leu Leu Glu Thr Ala Trp Glu Thr Ile Glu His Ala  
2770 2775 2780

Gly Ile Asn Pro His Thr Leu His Gly Thr Pro Thr Gly Val Phe Thr  
2785 2790 2795 2800

Gly Thr Asn Gly Gln Asp His Ala Ala His Ile Arg Gln Ala Pro Ser  
2805 2810 2815

Gly Thr Glu Gly Phe Val Leu Thr Gly Ala Ala Thr Ser Ile Ala Ser  
2820 2825 2830

Gly Arg Ile Ser Tyr Ile Leu Gly Leu Glu Gly Pro Ala Val Thr Leu  
2835 2840 2845

Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Cys Gln  
2850 2855 2860

Ser Leu Arg Ser Gly Glu Cys Thr Met Ala Leu Ala Gly Gly Ala Thr  
2865 2870 2875 2880

Val Met Thr Thr Pro Ile Thr Phe Thr Glu Phe Ala Arg Gln Arg Gly  
2885 2890 2895

Leu Ala Pro Asp Gly Arg Cys Lys Ala Phe Ser Ala Ala Ala Asp Gly  
2900 2905 2910

Thr Gly Trp Gly Glu Gly Val Gly Met Leu Leu Val Glu Arg Leu Ser  
2915 2920 2925

Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val Arg Gly Ser  
2930 2935 2940

Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly  
2945 2950 2955 2960

Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asn Ala Asp Leu  
2965 2970 2975

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Thr	Pro	Ala	Asp	Val	Asp	Ala	Val	Glu	Ala	His	Gly	Thr	Gly	Thr	Thr	2980	2985	2990
Leu	Gly	Asp	Pro	Ile	Glu	Ala	Gln	Ala	Ile	Leu	Ala	Thr	Tyr	Gly	Gln	2995	3000	3005
Asp	Arg	Pro	Gly	Asn	Gly	Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	3010	3015	3020
Val	Gly	His	Thr	Gln	Ala	Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	3025	3030	3035
Val	Met	Ala	Leu	Arg	His	Arg	Thr	Leu	Pro	Pro	Thr	Leu	His	Ala	Asp	3045	3050	3055
Glu	Pro	Ser	Pro	His	Val	Asp	Trp	Ser	Ala	Gly	Ala	Val	Gln	Leu	Leu	3060	3065	3070
Thr	Glu	Thr	Val	Pro	Trp	Pro	Gly	Gly	Glu	Gly	Arg	Pro	Arg	Arg	Ala	3075	3080	3085
Gly	Val	Ser	Ser	Phe	Gly	Val	Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	3090	3095	3100
Glu	Glu	Ala	Pro	Ala	Asp	Asp	Val	Pro	Gly	Gly	Pro	Pro	Ala	Asp	Glu	3105	3110	3115
Asp	Ala	Gly	Ser	Gly	Glu	Glu	Ala	Ala	Ala	Gly	Ser	Pro	Gly	Val	Trp	3125	3130	3135
Pro	Trp	Leu	Val	Ser	Ala	Lys	Ser	Gln	Pro	Ala	Leu	Arg	Ala	Gln	Ala	3140	3145	3150
Gln	Ala	Leu	His	Ala	His	Leu	Thr	Asp	His	Pro	Gly	Leu	Asp	Leu	Ala	3155	3160	3165
Asp	Val	Gly	Tyr	Thr	Leu	Ala	His	Ala	Arg	Ala	Val	Phe	Asp	His	Arg	3170	3175	3180
Ala	Thr	Leu	Ile	Ala	Ala	Asp	Arg	Asp	Thr	Phe	Leu	Gln	Ala	Leu	Gln	3185	3190	3195
Ala	Leu	Ala	Ala	Gly	Glu	Pro	His	Pro	Ala	Val	Ile	His	Ser	Ser	Ala	3205	3210	3215
Pro	Gly	Gly	Thr	Gly	Thr	Gly	Glu	Ala	Ala	Gly	Lys	Thr	Ala	Phe	Ile	3220	3225	3230
Cys	Ser	Gly	Gln	Gly	Thr	Gln	Arg	Pro	Gly	Met	Ala	His	Gly	Leu	Tyr	3235	3240	3245
His	Thr	His	Pro	Val	Phe	Ala	Ala	Ala	Leu	Asn	Asp	Ile	Cys	Thr	His	3250	3255	3260
Leu	Asp	Pro	His	Leu	Asp	His	Pro	Leu	Leu	Pro	Leu	Leu	Thr	Gln	Asn	3265	3270	3275
Asp	Asn	Asp	Asn	Asp	Asn	Glu	Asp	Ala	Ala	Ala	Leu	Leu	Gln	Gln	Thr	3285	3290	3295

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Pro Tyr Ala Gln Pro Ala Leu Phe Ala Phe Gln Val Ala Leu His Arg  
3300 3305 3310

Leu Leu Thr Asp Gly Tyr His Ile Thr Pro His Tyr Tyr Ala Gly His  
3315 3320 3325

Ser Leu Gly Glu Ile Thr Ala Ala His Leu Ala Gly Ile Leu Thr Leu  
3330 3335 3340

Thr Asp Ala Thr Thr Leu Ile Thr Gln Arg Ala Thr Leu Met Gln Thr  
3345 3350 3355 3360

Met Pro Pro Gly Thr Met Thr Thr Leu His Thr Thr Pro His His Ile  
3365 3370 3375

Thr His His Leu Thr Ala His Glu Asn Asp Leu Ala Ile Ala Ala Ile  
3380 3385 3390

Asn Thr Pro Thr Ser Leu Val Ile Ser Gly Thr Pro His Thr Val Gln  
3395 3400 3405

His Ile Thr Thr Leu Cys Gln Gln Gln Gly Ile Lys Thr Lys Thr Leu  
3410 3415 3420

Pro Thr Asn His Ala Phe His Ser Pro His Thr Asn Pro Ile Leu Asn  
3425 3430 3435 3440

Gln Leu His Gln His Thr Gln Thr Leu Thr Tyr His Pro Pro His Thr  
3445 3450 3455

Pro Leu Ile Thr Ala Asn Thr Pro Pro Asp Gln Leu Leu Thr Pro His  
3460 3465 3470

Tyr Trp Thr Gln Gln Ala Arg Asn Thr Val Asp Tyr Ala Thr Thr Thr  
3475 3480 3485

Gln Thr Leu His Gln His Gly Val Thr Thr Tyr Ile Glu Leu Gly Pro  
3490 3495 3500

Asp Asn Thr Leu Thr Thr Leu Thr His His Asn Leu Pro Asn Thr Pro  
3505 3510 3515 3520

Thr Thr Thr Leu Thr Leu Thr His Pro His His His Pro Gln Thr His  
3525 3530 3535

Leu Leu Thr Asn Leu Ala Lys Thr Thr Thr Trp His Pro His His  
3540 3545 3550

Tyr Thr His His His Asn Gln Pro His Thr His Thr His Leu Asp Leu  
3555 3560 3565

Pro Thr Tyr Pro Phe Gln His His His Tyr Trp Leu Glu Leu Pro Ser  
3570 3575 3580

Ala Gln Thr Ser Pro Gly Gln Arg Arg Ser Arg Arg Ser Ala Pro Asp  
3585 3590 3595 3600

Thr Ala Glu Ser Glu Phe Trp Asp Ala Val Asn Glu Glu Asp Leu Gln  
3605 3610 3615

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Ser Leu Ala Glu Thr Leu Asp Ile Asp Ala Ser Ala Leu Asp Thr Val  
3620 3625 3630

Val Pro Ala Leu Ser Ala Trp His Arg His Gln His Asp Gln Ala Arg  
3635 3640 3645

Ile Asn Thr Trp Thr Tyr Gln Glu Thr Trp Lys Pro Leu Thr Leu Pro  
3650 3655 3660

Thr Thr His Gln Pro His Gln Thr Trp Leu Ile Ala Ile Pro Glu Thr  
3665 3670 3675 3680

Gln Thr His His Pro His Ile Thr Asn Ile Leu Thr Asn Leu His His  
3685 3690 3695

His Gly Ile Thr Pro Ile Pro Leu Thr Val Asn His Thr His Thr Asn  
3700 3705 3710

Pro Gln His Leu His His Thr Leu His His Thr Arg Gln Gln Ala Gln  
3715 3720 3725

Asn His Thr Thr Gly Pro Ile Thr Gly Leu Leu Ser Leu Leu Ala Leu  
3730 3735 3740

Asp Glu Thr Pro His Pro His His Pro His Thr Pro Thr Gly Thr Leu  
3745 3750 3755 3760

Leu Asn Leu Thr Leu Pro Gln Thr His Thr Gln Thr His Pro Pro Thr  
3765 3770 3775

Pro Leu Trp Tyr Ala Thr Thr Asn Ala Thr Thr Thr His Pro Asn Asp  
3780 3785 3790

Pro Leu Thr His Pro Thr Gln Ala Gln Thr Trp Gly Leu Ala Arg Thr  
3795 3800 3805

Thr Leu Leu Glu His Pro Thr His Thr Ala Gly Ile Ile Asp Leu Pro  
3810 3815 3820

Thr Thr Pro Thr Pro His Thr Leu His His Leu Thr Gln Thr Leu Thr  
3825 3830 3835 3840

Gln Pro His His Gln Thr Gln Leu Ala Ile Arg Thr Thr Gly Thr His  
3845 3850 3855

Thr Arg Arg Leu Thr Pro Thr Thr Leu Thr Pro Thr His Gln Pro Pro  
3860 3865 3870

Thr Pro Thr Pro His Gly Thr Thr Leu Ile Thr Gly Gly Thr Gly Ala  
3875 3880 3885

Leu Ala Thr His Leu Thr His His Leu Thr Thr His Gln Pro Thr Gln  
3890 3895 3900

His Leu Leu Leu Thr Ser Arg Thr Gly Pro His Thr Pro His Ala Gln  
3905 3910 3915 3920

His Leu Thr Thr Gln Leu Gln Gln Lys Gly Ile His Leu Thr Ile Thr  
3925 3930 3935

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Thr Cys Asp Thr Ser Asn Pro Asp Gln Leu Gln Gln Leu Leu Asn Thr	3940	3945	3950
Ile Pro Pro Gln His Pro Leu Thr Thr Val Ile His Thr Ala Gly Val	3955	3960	3965
Asn Leu Phe Ala Pro Val Ser Glu Thr Asp Ala Glu Ser Phe Ser Ser	3970	3975	3980
Val Thr Ala Ala Lys Ala Thr Gly Ala Ala Ile Leu His Glu Leu Leu	3985	3990	4000
Leu Asp His Glu Thr Leu Glu His Phe Ile Leu Phe Ser Ser Gly Ala	4005	4010	4015
Gly Ala Trp Gly Ser Gly Asn Gln Cys Ala Tyr Ser Ala Ala Asn Ala	4020	4025	4030
Tyr Leu Asp Ala Leu Ala Thr His Arg Gln Thr His Gly Leu Pro Gly	4035	4040	4045
Ala Ser Ile Ala Trp Gly Pro Trp Ala Gly Lys Gly Met Ser Ala Gly	4050	4055	4060
Asp Ala Ala His Gly Tyr Leu Glu Lys Arg Gly Ile Leu Pro Met Glu	4065	4070	4080
Pro Arg Met Ala Leu Ala Ala Phe His Arg Ala Arg Ala Gln Arg Pro	4085	4090	4095
Asn Ser Asn Leu Ile Ile Ala Asp Ile Asp Trp Glu Arg Phe Val Pro	4100	4105	4110
Ala Phe Thr Ala Arg Arg His Ser Pro Leu Ile Glu Asp Ile Pro Glu	4115	4120	4125
Val Arg Gln Ala Ala Gln Glu Leu Glu Ala Ala Ala Ser Thr Ala Lys	4130	4135	4140
Thr Thr Thr Ala Gln Pro Ile Ala Thr Ser Leu Arg Glu Arg Leu Ala	4145	4150	4160
Arg Leu Thr Ser Ser Lys Gln Asn Gln Val Leu Leu Gly Leu Ile Arg	4165	4170	4175
Thr Gly Ile Cys Thr Val Leu Gly Leu Arg Asn Pro Glu Gly Ile Glu	4180	4185	4190
Asp Gln Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ser Ala	4195	4200	4205
Gln Phe Ser Lys Glu Leu Ala Lys Glu Thr Gly Leu Pro Leu Pro Pro	4210	4215	4220
Ser Leu Val Phe Asp Tyr Pro Thr Pro Gln Glu Cys Ala Ala His Leu	4225	4230	4240
Arg Thr Gln Leu Val Asp Leu Asp Asp Glu Glu Asp Ala Ala Leu Ser	4245	4250	4255

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Asn Ala Leu Pro Gln Val Ala His Arg Arg Thr Val Glu Asp Glu Pro  
4260 4265 4270

Ile Ala Ile Ile Gly Met Ala Cys Arg Phe Pro Gly Gly Val Arg Ser  
4275 4280 4285

Ala Asp Asp Leu Trp Glu Leu Leu Ala Ser Gly Lys Asp Ala Ile Gly  
4290 4295 4300

Val Phe Pro Thr Asp Arg Gly Trp Asp Leu Asp Thr Leu Tyr Asp Pro  
4305 4310 4315 4320

Asp Pro Asp His Pro Gly Thr Cys Tyr Thr Arg Asn Gly Gly Phe Leu  
4325 4330 4335

Tyr Gly Ala Gly His Phe Asp Ala Glu Phe Phe Gly Ile Ser Pro Arg  
4340 4345 4350

Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ala  
4355 4360 4365

Trp Glu Thr Ile Glu His Ala Gly Ile Asn Pro His Thr Leu His Gly  
4370 4375 4380

Thr Pro Thr Gly Val Phe Ala Gly Ile Asn Ala Gln Asp His Ala Ala  
4385 4390 4395 4400

His Ile Arg Gln Ser Arg Asp Val Glu Thr Ile Glu Gly Tyr Ala Leu  
4405 4410 4415

Thr Gly Ser Ser Gly Ser Val Ala Ser Gly Arg Val Ala Tyr Thr Leu  
4420 4425 4430

Gly Leu Glu Gly Pro Ala Val Ser Val Asp Thr Ala Cys Ser Ser Ser  
4435 4440 4445

Leu Val Ala Leu His Trp Ala Ala Gln Ala Leu Arg Ala Gly Glu Cys  
4450 4455 4460

Ser Met Ala Leu Ala Gly Gly Val Thr Val Met Ser Ser Pro Gly Thr  
4465 4470 4475 4480

Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala Asp Gly Arg Cys  
4485 4490 4495

Lys Ala Tyr Ser Ala Ala Ala Asp Gly Thr Gly Trp Ala Glu Gly Val  
4500 4505 4510

Gly Met Leu Leu Val Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His  
4515 4520 4525

Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala  
4530 4535 4540

Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile  
4545 4550 4555 4560

Arg Gln Ala Leu Ala Asn Ala Gly Leu Thr Pro Ala Asp Val Asp Ala  
4565 4570 4575

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Val	Glu	Gly	His	Gly	Thr	Gly	Thr	Thr	Leu	Gly	Asp	Pro	Ile	Glu	Ala	
			4580						4585					4590		
Gln	Ala	Leu	Leu	Ala	Ala	Tyr	Gly	Gln	His	Arg	Pro	His	His	Arg	Pro	
		4595					4600					4605				
Leu	Trp	Leu	Gly	Ser	Leu	Lys	Ser	Asn	Ile	Gly	His	Ala	Gln	Ala	Ala	
	4610					4615					4620					
Ala	Gly	Val	Gly	Gly	Val	Ile	Lys	Met	Val	Met	Ala	Leu	Arg	Asn	Gly	
4625					4630					4635				4640		
Leu	Leu	Pro	Gln	Thr	Leu	His	Val	Asp	Glu	Pro	Thr	Pro	Gln	Val	Asp	
			4645						4650					4655		
Trp	Ser	Thr	Gly	Ala	Val	Gln	Leu	Leu	Thr	Gln	Pro	Val	Pro	Trp	Pro	
		4660					4665					4670				
Ala	Asp	Pro	Ala	Gly	Arg	Pro	Arg	His	Ala	Gly	Val	Ser	Ser	Phe	Gly	
	4675					4680					4685					
Val	Ser	Gly	Thr	Asn	Ala	His	Ile	Ile	Leu	Glu	Glu	Ala	Pro	Thr	Pro	
	4690				4695						4700					
Gln	Asp	Ser	Asp	Thr	Asp	Asp	Glu	Pro	Pro	Ala	Asn	Ala	Pro	Ala	Leu	
4705				4710					4715					4720		
Pro	His	Pro	Leu	Pro	Leu	Pro	Val	Pro	Val	Ser	Ala	Arg	Ser	Glu	Ala	
			4725				4730					4735				
Gly	Leu	Arg	Ala	Gln	Ala	Gln	Ala	Leu	Arg	Gln	Tyr	Val	Ala	Ala	Arg	
		4740					4745					4750				
Pro	Asp	Met	Ser	Pro	Ala	Asp	Ile	Gly	Ala	Gly	Leu	Ala	Arg	Gly	Arg	
	4755					4760					4765					
Ala	Val	Leu	Glu	His	Arg	Ala	Val	Ile	Leu	Ala	Ala	Asp	Arg	Glu	Glu	
	4770				4775					4780						
Leu	Ala	Gln	Ala	Leu	Thr	Ala	Leu	Ala	Ala	Gly	Glu	Pro	His	Pro	His	
4785				4790						4795				4800		
Ile	Thr	Thr	Gly	His	Thr	Arg	Gly	Gly	Asp	Arg	Gly	Gly	Val	Val	Phe	
		4805					4810						4815			
Val	Phe	Pro	Gly	Gln	Gly	Gly	Gln	Trp	Ala	Gly	Met	Gly	Leu	Thr	Leu	
		4820					4825					4830				
Leu	Thr	Ser	Ser	Pro	Val	Phe	Ala	Glu	His	Ile	Asp	Ala	Cys	Glu	Lys	
	4835					4840					4845					
Ala	Leu	Thr	Pro	Trp	Val	Pro	Trp	Ser	Leu	Thr	Asp	Ile	Leu	His	Arg	
	4850				4855					4860						
Asp	Pro	Asp	Asp	Pro	Ala	Trp	Gln	Gln	Ala	Asp	Val	Val	Gln	Pro	Val	
4865				4870					4875				4880			
Leu	Phe	Ser	Ile	Met	Val	Ser	Leu	Ala	Ala	Leu	Trp	Arg	Ser	Tyr	Gly	
			4885				4890						4895			

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Ile Glu Pro Asp Ala Val Leu Gly His Ser Gln Gly Glu Ile Ala Ala  
4900 4905 4910

Ala His Ile Cys Gly Ala Leu Ser Leu Lys Asp Ala Ala Lys Thr Val  
4915 4920 4925

Ala Leu Arg Ser Arg Ala Leu Ala Ala Val Arg Gly Arg Gly Ala Met  
4930 4935 4940

Ala Ser Leu Pro Leu Pro Ala Gln Asp Val Gln Gln Leu Ile Ser Glu  
4945 4950 4955 4960

Arg Trp Glu Gly Gln Leu Trp Val Ala Ala Leu Asn Gly Pro His Ser  
4965 4970 4975

Thr Thr Val Ser Gly Asp Thr Lys Ala Val Asp Glu Val Leu Ala His  
4980 4985 4990

Cys Thr Asp Thr Gly Leu Arg Ala Lys Arg Ile Pro Val Asp Tyr Ala  
4995 5000 5005

Ser His Cys Pro His Val Gln Pro Leu His Asp Glu Leu Leu His Leu  
5010 5015 5020

Leu Gly Asp Ile Thr Pro Gln Pro Ser Thr Val Pro Phe Phe Ser Thr  
5025 5030 5035 5040

Val Glu Gly Thr Trp Leu Asp Thr Thr Thr Leu Asp Ala Ala Tyr Trp  
5045 5050 5055

Tyr Arg Asn Leu His Gln Pro Val Arg Phe Ser His Ala Ile Gln Thr  
5060 5065 5070

Leu Thr Asp Asp Gly His Arg Ala Phe Ile Glu Ile Ser Pro His Pro  
5075 5080 5085

Thr Leu Val Pro Ala Ile Glu Asp Thr Thr Glu Asn Thr Thr Glu Asn  
5090 5095 5100

Ile Thr Ala Thr Gly Ser Leu Arg Arg Gly Asp Asn Asp Thr His Arg  
5105 5110 5115 5120

Phe Leu Thr Ala Leu Ala His Thr His Thr Thr Gly Ile Gly Thr Pro  
5125 5130 5135

Thr Thr Trp His His His Tyr Thr Gln Thr His Pro His Pro Asn Pro  
5140 5145 5150

His Thr His Leu Asp Leu Pro Thr Tyr Pro Phe Gln His Gln His Tyr  
5155 5160 5165

Trp Leu Gln Pro Pro Thr Thr Thr Thr Asp Leu Thr Thr Thr Gly Leu  
5170 5175 5180

Thr Pro Thr His His Pro Leu Leu Thr Ala Thr Leu Thr Leu Ala Asp  
5185 5190 5195 5200

Asn Asn Thr Gln Leu Leu Thr Gly Arg Leu Ser Leu Arg Thr His Pro  
5205 5210 5215



Trp Leu Thr Asp His Thr Val Ala Gly Met Val Leu Leu Pro Gly Thr  
5220 5225 5230

Ala Leu Leu Glu Leu Ala Leu Gln Ala Gly Glu Arg Val Asp Cys Pro  
5235 5240 5245

Arg Val Glu Glu Leu Thr Leu His Ala Pro Leu Val Ile Pro His Thr  
5250 5255 5260

Glu Asp Val Thr Leu Gln Val Thr Val Arg Ala Ala Asp Glu Ser Gly  
5265 5270 5275 5280

His Arg Ala Leu Ala Ile His Ser Tyr Ser Gly Thr Ala Ser Ser Ala  
5285 5290 5295

Asp Arg Glu Trp Thr Arg His Ala Thr Gly Leu Leu Thr His His Ala  
5300 5305 5310

Asp Thr Asp His Arg Ala Asp Thr His Thr Asp Ala Cys Leu Gly Gly  
5315 5320 5325

Ser Trp Pro Pro Pro Gly Ala Gln Pro Ile Glu Leu Gly Asp Val Tyr  
5330 5335 5340

Gly Arg Met Ala Ala Asp Ser Asp Ile Ala Tyr Gly Pro Val Phe Gln  
5345 5350 5355 5360

Gly Leu His Ala Ala Trp Arg Phe Gly Asp Asp Val Leu Ala Glu Val  
5365 5370 5375

Arg Leu Pro Glu Glu Ala Leu Arg Asp Ala Pro Ala Ala Ala Phe Gly  
5380 5385 5390

Val His Pro Ala Leu Leu Asp Ala Ala Leu His Ala Thr Ala Leu Thr  
5395 5400 5405

Pro Gln Asn Gly Asp Gly Ser Thr Glu Asn Val Ala Gln Glu Ser Met  
5410 5415 5420

Pro Asp Arg Ala Ala His Gln Ala Arg Leu Pro Phe Ser Trp Ser Gly  
5425 5430 5435 5440

Val Ser Leu His Thr Ala Gly Ser Ser Val Leu Arg Val Arg Leu Ser  
5445 5450 5455

Arg Ser Pro Gln His Gly Asn Ala Val Ala Leu Thr Ala Ala Asp Glu  
5460 5465 5470

Asp Gly Arg Pro Val Val Thr Ile Glu Ser Leu Ala Leu Arg Pro Val  
5475 5480 5485

Ser Thr Glu Glu Leu Arg Ala Ala Ala Asp Arg Thr Pro Glu His Glu  
5490 5495 5500

Ser Leu Phe Arg Leu Asp Trp Val Ser Val Pro Val Pro Ala Asn Ala  
5505 5510 5515 5520

Pro Ser Pro Thr Ala Asp Arg Pro Trp Ala Val Ile Gly Ala Gly Leu  
5525 5530 5535

Pro His Leu Pro Gly Leu Thr Glu His Glu His Val Thr Ala Tyr Asp  
5540 5545 5550

Glu Pro Ala Asp Leu Leu Leu Ala Leu Asp Arg Gly Ala Pro Pro Pro  
5555 5560 5565

Gly Val Leu Val Val Gly Gly Val Ala His Thr Glu Ala Arg Glu Tyr  
5570 5575 5580

Ser Ala Glu Ala Pro Gly Glu Arg Gly Thr Glu Ala Cys Glu Ala Arg  
5585 5590 5595 5600

Pro Asp Val Val His Val Gly Val Val His Thr Ala Ala Val His Ala  
5605 5610 5615

Ala Ala Ala Gln Met Leu Ala Arg Leu Gln Ala Trp Leu Gly Asp Glu  
5620 5625 5630

Arg Leu Ala Asp Ser Arg Leu Leu Val Leu Thr Cys Gly Ala Val Ala  
5635 5640 5645

Arg Ala Ser Gly Asp Asp Ala Thr Asp Leu Pro Gly Ala Ala Val Trp  
5650 5655 5660

Gly Leu Val Arg Ser Ala Gln Ser Glu His Pro Asp Arg Ile Thr Leu  
5665 5670 5675 5680

Leu Asp Phe Glu Arg Gly Thr Glu Ala Glu Pro Gly Gln Leu Ala Thr  
5685 5690 5695

Ala Leu Asn Cys Gly Glu Arg Gln Leu Ala Val Arg Pro Gly Gly Leu  
5700 5705 5710

Phe Thr Pro Arg Leu Val Arg Ala Pro Arg Val Ala Asp Ala Val Pro  
5715 5720 5725

Ala Val Pro Ala Val Ala Val Pro Ser Ala Gly His Ala Ala Val Pro  
5730 5735 5740

Ala Ala Gly Pro Phe Leu Pro Gly Gly Thr Val Leu Ile Thr Gly Gly  
5745 5750 5755 5760

Thr Gly Val Leu Gly Arg Leu Val Ala Arg His Leu Val Glu Ala His  
5765 5770 5775

Gly Val Arg His Leu Leu Leu Ala Gly Arg Arg Gly Pro Asp Ala Glu  
5780 5785 5790

Gly Ala Pro Glu Leu Arg Ala Glu Leu Gly Gly Leu Gly Ala Thr Val  
5795 5800 5805

Glu Val Val Ala Cys Asp Ala Ala Asp Arg Gln Gln Leu Ala Asp Leu  
5810 5815 5820

Leu Thr Arg Ile Pro Asp Asp Arg Pro Leu Thr Gly Val Val His Ser  
5825 5830 5835 5840

Ala Gly Ile Leu Asp Asp Gly Val Ile Thr Ser Leu Ser Pro Glu Arg  
5845 5850 5855

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Leu Gly Ala Val Leu Arg Ala Lys Ala Asp Ala Ala Leu Leu Leu Asp  
 5860 5865 5870  
 Glu Leu Thr Arg Gly Ala Glu Leu Ser Ala Phe Val Met Phe Ser Ser  
 5875 5880 5885  
 Ala Ser Ala Val Val Gly Ser Pro Gly Gln Gly Asn Tyr Ala Ala Ala  
 5890 5895 5900  
 Asn Ala Val Leu Asp Phe Leu Ala His Arg Arg Arg Ala Glu Gly Leu  
 5905 5910 5915 5920  
 Pro Ala Val Ser Leu Ala Trp Gly Leu Trp Glu Glu Gly Thr Gly Met  
 5925 5930 5935  
 Thr Gly His Leu Asp Val Asp Asp His Ala Arg Ile Ser Arg Ala Gly  
 5940 5945 5950  
 Met Arg Pro Leu Pro Thr Ala Glu Ala Leu Ala Leu Phe Asp Ala Ala  
 5955 5960 5965  
 Leu Ala Asp Gly Glu Pro Phe Leu Met Pro Ala Arg Leu Asp Leu Thr  
 5970 5975 5980  
 Ala Val Arg Ser Gly Ala Ala Ser Ala Pro Val Pro Pro Leu Leu Gln  
 5985 5990 5995 6000  
 Gly Leu Leu Gln Leu Pro Arg Ser Arg Ser Ala Ala Ala Ala Pro Gly  
 6005 6010 6015  
 His Gly Ala Pro Ala Ala Asp Glu Ala Ala Ala Trp Arg Glu Arg Leu  
 6020 6025 6030  
 Ala Arg Gln Ser Ala Gly Glu Arg Arg Gln Ala Leu Leu Arg Leu Val  
 6035 6040 6045  
 Arg Ser His Val Ala Ala Val Leu Gly His Ser Gly Ala Asp Gly Ile  
 6050 6055 6060  
 Asp Ala Ser Arg Ala Phe Arg Glu Leu Gly Phe Asp Ser Leu Thr Ala  
 6065 6070 6075 6080  
 Val Glu Leu Arg Asn Arg Leu Thr Ala Ala Thr Gly Leu Arg Leu Arg  
 6085 6090 6095  
 Ala Thr Leu Ala Phe Asp Phe Pro Thr Pro Ala Ala Leu Ala Glu His  
 6100 6105 6110  
 Leu Gly Glu Arg Leu Leu Pro Asp Gln Glu Ala Thr Gly Glu Gln Ala  
 6115 6120 6125  
 Gly Asp Gln Leu Ser Gly Gly Ser Glu Glu Asp Val Arg Ser Leu Leu  
 6130 6135 6140  
 Thr Ser Ile Pro Ile Gly Arg Leu Arg Asp Ala Gly Leu Leu Gly Pro  
 6145 6150 6155 6160  
 Leu Leu Thr Leu Ala Asp Thr Gly Arg Gly Ala Ser Gly Ala Ala Ala  
 6165 6170 6175

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Gly Pro Glu Asp Ala Pro Pro Ser Gly Gln Asp Thr Pro Ala Pro Val  
6180 6185 6190

Ser Ile Asp Glu Met Asp Ile Asp Asp Leu Met Asp Leu Ala His Gly  
6195 6200 6205

His Gly Thr Ala Pro Ala Arg Glu Pro Ala Asp Ala Glu Asp Ser Ser  
6210 6215 6220

Ser Ser Arg Asn Arg Thr His His Thr His Glu Gly Glu Thr Ala  
6225 6230 6235

<210> 5

<211> 4881

<212> PRT

<213> Streptomyces avermitilis

<400> 5

Met Ala Asn Glu Glu Lys Leu Arg Asp Tyr Leu Lys Arg Val Thr Ala  
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Asp Leu Leu Asn Val Arg Arg Arg Leu Gln Gln Ile Glu Ser Gly Glu  
20 25 30

Gln Glu Pro Ile Ala Ile Val Gly Met Ala Cys Arg Phe Pro Gly Gly  
35 40 45

Val Glu Ser Ala Glu Asp Phe Trp Glu Leu Ile Ala Ser Gly Arg Asp  
50 55 60

Ala Val Gly Glu Phe Pro Val Asp Arg Gly Trp Asp Val Glu Ala Phe  
65 70 75 80

Tyr Asp Pro Glu Pro Gly Arg Ala Gly Ser Ser Tyr Thr Arg Arg Gly  
85 90 95

Gly Phe Leu Glu Gly Ala Ala Glu Phe Asp Ala Gly Phe Phe Gly Ile  
100 105 110

Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Met Leu  
115 120 125

Glu Val Ser Trp Glu Ala Leu Glu Arg Ala Gly Ile Asp Pro Ala Thr  
130 135 140

Leu Arg Gly Ser Arg Thr Gly Val Phe Ala Gly Leu Met Ser Gln Asp  
145 150 155 160

Tyr Ala Thr Arg Leu Leu Ser Val Pro Asp Asp Leu Ala Gly Tyr Leu  
165 170 175

Gly Asn Gly Asn Ala Gly Ser Ile Leu Ser Gly Arg Val Ala Tyr Thr  
180 185 190

Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser  
195 200 205

Ser Leu Val Ala Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu  
210 215 220

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Ser	Ser	Phe	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val	Met	Ser	Thr	Pro	Gly
225					230					235					240
Met	Phe	Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ser	Pro	Asp	Gly	Arg
				245					250					255	
Cys	Lys	Ala	Tyr	Ala	Ser	Ala	Ala	Asp	Gly	Thr	Gly	Met	Ser	Glu	Gly
			260					265					270		
Val	Gly	Ile	Leu	Leu	Leu	Glu	Arg	Leu	Ser	Glu	Ala	Glu	Arg	Arg	Gly
		275					280					285			
His	Arg	Val	Leu	Ala	Val	Val	Arg	Gly	Ser	Ala	Val	Asn	Gln	Asp	Gly
	290					295					300				
Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Pro	Ser	Gln	Gln	Arg	Val
305					310					315					320
Ile	Arg	Gln	Ala	Leu	Ala	Cys	Ala	Gly	Leu	Ser	Val	Ala	Asp	Val	Asp
				325					330					335	
Val	Val	Glu	Gly	His	Gly	Thr	Gly	Thr	Thr	Leu	Gly	Asp	Pro	Ile	Glu
			340					345					350		
Ala	Gln	Ala	Leu	Leu	Ala	Thr	Tyr	Gly	Gln	Arg	Ala	Gly	Asp	Thr	Pro
		355					360					365			
Val	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His	Ala	Gln	Ala	Ala
	370					375					380				
Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Met	Ala	Leu	Arg	Ala	Gly
385					390					395					400
Val	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Glu	Pro	Ser	Ser	Gln	Val	Asp
				405					410					415	
Trp	Ser	Ser	Gly	Ser	Val	Arg	Val	Leu	Ala	Asp	Glu	Val	Glu	Trp	Pro
			420					425					430		
Gly	Val	Glu	Gly	Arg	Leu	Arg	Arg	Ala	Gly	Val	Ser	Ala	Phe	Gly	Val
		435					440					445			
Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Glu	Ala	Ser	Gly	Gly	Ala
	450					455					460				
Gly	Gly	Gly	Ala	Gly	Arg	Leu	Gln	Glu	Leu	Gly	Pro	Gly	Val	Val	Ser
465					470					475					480
Gly	Ser	Gly	Val	Val	Pro	Trp	Val	Val	Ser	Ala	Arg	Ser	Glu	Leu	Ala
				485					490					495	
Leu	Arg	Gly	Gln	Ala	Arg	Arg	Leu	Arg	Gly	Val	Val	Ala	Val	Gly	Gly
			500					505					510		
Gly	Ala	Asp	Gly	Val	Gly	Val	Ser	Pro	Ala	Gly	Val	Gly	Arg	Ala	Leu
		515					520					525			
Val	Ser	Glu	Arg	Ser	Val	Phe	Glu	His	Arg	Ala	Val	Val	Val	Ala	Glu
		530				535					540				

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Asp	Arg	Asp	Glu	Phe	Leu	His	Ala	Leu	Asp	Ala	Leu	Ala	Gly	Gly	Arg	
545					550				555						560	
Pro	Val	Pro	Gly	Val	Val	Glu	Gly	Arg	Thr	Thr	Ser	Gly	Glu	Leu	Ala	
				565					570					575		
Val	Leu	Phe	Ala	Gly	Gln	Gly	Thr	Gln	Arg	Ala	Gly	Met	Gly	Arg	Glu	
			580					585					590			
Leu	Tyr	Glu	Ala	Tyr	Pro	Val	Phe	Ala	Gln	Ala	Ile	Asp	Glu	Ile	Cys	
		595					600					605				
Ala	Glu	Ala	Asp	Thr	Ala	Arg	Thr	Asp	Pro	Gly	Ala	Pro	Gly	Leu	Arg	
	610					615					620					
Asp	Val	Leu	Phe	Ala	Pro	Gln	Asp	Ser	Pro	Glu	Gly	Arg	Leu	Ile	Glu	
625					630					635					640	
Asp	Thr	Gly	Phe	Ala	Gln	Pro	Ala	Leu	Phe	Ala	Phe	Glu	Val	Ala	Leu	
				645					650					655		
Phe	Arg	Leu	Leu	Glu	Thr	Trp	Gly	Leu	Thr	Pro	Asp	Tyr	Val	Leu	Gly	
			660					665					670			
His	Ser	Val	Gly	Glu	Leu	Ala	Ala	Ala	His	Val	Ala	Gly	Met	Leu	Cys	
		675					680					685				
Leu	Ala	Asp	Ala	Val	Ala	Leu	Val	Val	Ala	Arg	Gly	Arg	Leu	Met	Gln	
	690					695					700					
Gly	Leu	Pro	Ser	Gly	Gly	Ala	Met	Val	Ala	Ile	Glu	Ala	Ser	Glu	Asp	
705					710					715					720	
Glu	Ile	Leu	Pro	Leu	Pro	Asp	Glu	Tyr	Ala	Ser	Arg	Val	Ala	His	Ala	
				725					730					735		
Ala	Val	Asn	Gly	Pro	Arg	Ser	Ile	Val	Leu	Ser	Gly	Asp	Glu	Asp	Ala	
			740					745					750			
Val	Leu	Asp	Leu	Ala	Gln	Gln	Trp	Ala	Ala	Arg	Gly	Arg	Arg	Thr	Arg	
		755					760					765				
Arg	Leu	Arg	Thr	Ser	His	Ala	Phe	His	Ser	Pro	His	Met	Asp	Ala	Met	
		770				775					780					
Leu	Gly	Asp	Phe	Arg	Arg	Ala	Ala	Glu	Gln	Val	Thr	Phe	Ser	Ala	Pro	
785					790					795					800	
Arg	Ile	Pro	Val	Val	Ser	Asn	Val	Thr	Gly	Ala	Pro	Leu	Pro	Ala	Glu	
				805					810					815		
Thr	Met	Cys	Thr	Pro	Asp	Tyr	Trp	Val	Glu	His	Ala	Arg	Ser	Thr	Val	
			820					825					830			
Arg	Phe	Ala	Asp	Gly	Ile	Ser	Trp	Leu	Gln	Glu	Gln	Gly	Val	Thr	Thr	
		835					840					845				
Cys	Leu	Glu	Ile	Gly	Pro	Asp	Gly	Thr	Leu	Ser	Ala	Leu	Ala	Gln	Asp	
	850					855					860					

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Ser	Leu	Ser	Ala	Pro	Ala	Arg	Ala	Ile	Pro	Ala	Leu	Arg	Pro	Asp	Gln	865	870	875	880
Pro	Glu	Ala	Arg	Ser	Val	Met	Thr	Ala	Leu	Ala	Glu	Leu	Phe	Val	Ala	885	890		895
Gly	Thr	Ala	Val	Glu	Trp	Ala	Gly	Val	Phe	Glu	Gly	Thr	Ala	Arg	Glu	900	905		910
Val	Gly	Asp	Gly	Cys	Gly	Val	Glu	Leu	Pro	Thr	Tyr	Ala	Phe	Glu	Arg	915	920		925
Glu	Arg	Phe	Trp	Leu	Asp	Val	Glu	Glu	Gly	Ser	Ala	Gly	Gly	Ser	Gly	930	935		940
Val	Ser	Gly	Met	Trp	Gly	Gly	Pro	Leu	Trp	Glu	Ala	Val	Glu	Cys	Gly	945	950		955
Asp	Ala	Gly	Val	Val	Ala	Ser	Leu	Leu	Gly	Val	Asp	Glu	Gly	Ala	Ser	965	970		975
Leu	Gly	Ala	Val	Val	Ser	Ala	Leu	Gly	Glu	Trp	Gly	Arg	Val	Arg	His	980	985		990
Glu	Arg	Glu	Val	Val	Asp	Gly	Trp	Arg	Tyr	Arg	Glu	Val	Trp	Arg	Pro	995	1000		1005
Val	Ser	Gly	Gly	Gly	Val	Gly	Gly	Leu	Ser	Gly	Ala	Trp	Leu	Val	Val	1010	1015		1020
Ser	Glu	Gly	Glu	Ala	Gly	Pro	Val	Asp	Val	Val	Ala	Glu	Gly	Leu	Glu	1025	1030		1035
Arg	Cys	Gly	Ala	Arg	Val	Val	Arg	Val	Glu	Val	Glu	Ala	Gly	Cys	Val	1045	1050		1055
Ser	Arg	Glu	Val	Leu	Ala	Gly	His	Leu	Arg	Glu	Ala	Val	Asp	Gly	Glu	1060	1065		1070
Ala	Val	Gly	Gly	Val	Val	Ser	Leu	Val	Gly	Trp	Gly	Ser	Gly	Val	Val	1075	1080		1085
Gln	Ala	Gly	Val	Ala	Ser	Val	Gly	Leu	Val	Gln	Ala	Leu	Gly	Asp	Val	1090	1095		1100
Gly	Val	Gly	Ala	Arg	Leu	Trp	Cys	Val	Thr	Gly	Gly	Ala	Val	Ser	Val	1105	1110		1115
Gly	Gly	Arg	Asp	Ala	Val	Trp	Gly	Pro	Ala	Ser	Gly	Val	Val	Trp	Gly	1125	1130		1135
Leu	Gly	Arg	Val	Val	Gly	Ala	Glu	Ala	Pro	Asp	Arg	Trp	Gly	Gly	Leu	1140	1145		1150
Val	Asp	Val	Pro	Glu	Leu	Val	Asp	Glu	Arg	Val	Val	Asp	Gly	Leu	Val	1155	1160		1165
Gly	Val	Leu	Ala	Gly	Val	Gly	Gly	Gly	Gly	Glu	Ser	Glu	Phe	Ala	Val	1170	1175		1180

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Arg Ser Ser Gly Ala Phe Val Arg Arg Leu Val Arg Ala Pro Leu Glu  
1185 1190 1195 1200

Glu Ala Val Ala Glu Arg Glu Trp Arg Pro Arg Gly Thr Val Leu Val  
1205 1210 1215

Thr Gly Gly Thr Gly Glu Leu Gly Ala His Val Ala Arg Trp Met Ala  
1220 1225 1230

Arg Arg Gly Ala Glu His Leu Leu Leu Val Ser Arg Arg Gly Glu Ser  
1235 1240 1245

Ala Gln Gly Val Glu Glu Leu Arg Ala Asp Leu Met Gly Leu Gly Ala  
1250 1255 1260

Arg Val Ser Val Val Ala Cys Asp Ala Ala Asp Arg Glu Ala Leu Ala  
1265 1270 1275 1280

Glu Val Leu Arg Ser Ala Val Pro Ala Glu Cys Pro Leu Gly Val Val  
1285 1290 1295

Val His Ala Ala Gly Val Val Asp Asp Gly Val Leu Glu Gly Leu Ser  
1300 1305 1310

Ser Glu Arg Val Thr Gly Val Leu Arg Ala Lys Ala Leu Ala Ala Trp  
1315 1320 1325

Asn Leu His Glu Leu Thr Arg Gly Ala Asp Leu Ser Gly Phe Val Val  
1330 1335 1340

Phe Ser Ser Ala Ala Ala Thr Phe Gly Pro Ala Gly Gln Gly Ser Tyr  
1345 1350 1355 1360

Ala Ala Ala Asn Ala Tyr Val Glu Ala Ile Val Arg His Arg Arg Gly  
1365 1370 1375

Glu Gly Leu Pro Gly Leu Ala Val Ala Trp Gly Pro Trp Ala Gly Gly  
1380 1385 1390

Gly Met Ala Glu Gly Ala Val Gly Gln Met Arg Arg Arg Gly Leu Ala  
1395 1400 1405

Ala Met Thr Pro Glu Thr Ala Leu Val Ala Leu Gly Gln Ala Leu Asp  
1410 1415 1420

His Asp Glu Thr Cys Val Thr Val Ala Asp Ile Asp Trp Asp Arg Phe  
1425 1430 1435 1440

Thr Ala Asn Ser Leu Pro Gly Ser Arg Leu Ser Pro Leu Ile Ser Asp  
1445 1450 1455

Ile Pro Glu Ala Arg Leu Ala Arg Glu Thr Thr Gly Leu Asp Thr Ala  
1460 1465 1470

Thr Ala Ser Pro Asp Ser Phe Ser Ala Arg Leu Lys Ala Met Asp Thr  
1475 1480 1485

Ala Glu Gln Glu Arg Ala Leu Leu Asp Leu Val Arg Thr Tyr Ala Ala  
1490 1495 1500



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Thr Val Leu Gly His Ser Thr Pro Thr Ala Val Arg Pro Glu Arg Ala	1505	1510	1515	1520
Phe Arg Asp Leu Gly Phe Val Ser Val Ser Ala Val Glu Leu Arg Asn	1525	1530	1535	
Arg Leu Asn Ala Val Thr Gly Leu Leu Leu Pro Thr Thr Leu Ile Phe	1540	1545	1550	
Asp Tyr Pro Thr Pro Ser Ala Leu Ala Gly Tyr Leu Lys Glu Gln Leu	1555	1560	1565	
Glu Glu Gly Ala Gly Gly Gln Arg Asp Ile Ala Pro Pro Val Pro Ala	1570	1575	1580	
Ser Arg Val Asp Val Asp Glu Pro Ile Ala Ile Val Gly Met Ala Cys	1585	1590	1595	1600
Arg Phe Pro Gly Gly Val Glu Ser Ala Glu Asp Leu Trp Glu Leu Val	1605	1610	1615	
Ala Ser Gly Arg Asp Ala Val Gly Glu Phe Pro Val Asp Arg Gly Trp	1620	1625	1630	
Asp Val Glu Ala Phe Tyr Asp Pro Glu Pro Gly Arg Ala Gly Ser Ser	1635	1640	1645	
Tyr Thr Arg Arg Gly Gly Phe Leu Glu Gly Ala Ala Glu Phe Asp Ala	1650	1655	1660	
Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln	1665	1670	1675	1680
Gln Arg Leu Met Leu Glu Val Ser Trp Glu Ala Leu Glu Arg Ala Gly	1685	1690	1695	
Ile Asp Pro Ala Thr Leu Arg Gly Ser Thr Thr Gly Val Phe Ala Gly	1700	1705	1710	
Met Cys Ser Gln Asp Tyr Ala Asp Leu Val Arg Arg Ala Thr Glu Asp	1715	1720	1725	
Leu Glu Gly Tyr Ala Met Thr Gly Leu Ser Ser Ser Val Thr Ser Gly	1730	1735	1740	
Arg Val Ala Tyr Thr Leu Gly Leu Glu Gly Pro Ala Val Thr Val Asp	1745	1750	1755	1760
Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Cys Gln Ala	1765	1770	1775	
Leu Arg Ser Gly Glu Cys Ser Leu Ala Leu Ala Gly Gly Val Thr Val	1780	1785	1790	
Met Ser Thr Pro Gly Ala Phe Val Glu Phe Ser Arg Gln Arg Gly Leu	1795	1800	1805	
Ser Pro Asp Gly Arg Cys Lys Ala Tyr Gly Ser Gly Ala Asp Gly Val	1810	1815	1820	

Gly Trp Ala Glu Gly Val Gly Val Leu Leu Val Glu Arg Leu Ser Glu  
1825 1830 1835 1840

Ala Glu Arg Arg Gly His Arg Val Leu Ala Val Val Arg Gly Ser Ala  
1845 1850 1855

Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro  
1860 1865 1870

Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Cys Ala Gly Leu Ser  
1875 1880 1885

Val Ala Asp Val Asp Val Val Glu Gly His Gly Thr Gly Thr Thr Leu  
1890 1895 1900

Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Gly  
1905 1910 1915 1920

Arg Ser Gly Glu Arg Pro Val Trp Leu Gly Ser Val Lys Ser Asn Ile  
1925 1930 1935

Gly His Ala Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys Met Val  
1940 1945 1950

Met Ala Leu Arg Ala Gly Val Leu Pro Arg Thr Leu His Val Asp Glu  
1955 1960 1965

Pro Ser Ser Gln Val Asp Trp Ser Ser Gly Ser Val Arg Val Leu Ala  
1970 1975 1980

Asp Glu Val Glu Trp Pro Gly Val Glu Gly Arg Leu Arg Arg Ala Gly  
1985 1990 1995 2000

Val Ser Ala Phe Gly Val Ser Gly Thr Asn Ala His Val Ile Leu Glu  
2005 2010 2015

Glu Ala Ser Gly Gly Ala Asp Gly Gly Ala Gly Arg Leu Gln Glu Leu  
2020 2025 2030

Gly Pro Gly Val Val Ser Gly Ser Gly Val Val Pro Trp Val Val Ser  
2035 2040 2045

Ala Arg Ser Glu Leu Ala Leu Arg Gly Gln Ala Arg Arg Leu Arg Gly  
2050 2055 2060

Val Val Ala Val Gly Gly Gly Ala Asp Gly Val Gly Val Ser Pro Ala  
2065 2070 2075 2080

Gly Val Gly Arg Ala Leu Val Ser Glu Arg Ser Val Phe Glu His Arg  
2085 2090 2095

Ala Val Val Val Ala Glu Asp Arg Asp Glu Phe Leu His Ala Leu Asp  
2100 2105 2110

Ala Leu Ala Glu Gly Ala Pro Thr Ala Gly Val Val Gln Gly Val Ala  
2115 2120 2125

Gly Pro Ala Ala Asp Gly Lys Ile Ala Met Leu Phe Gly Gly Gln Gly  
2130 2135 2140

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Thr	His	Trp	Glu	Gly	Met	Ala	Gln	Glu	Leu	Leu	Gly	Ser	Ser	Pro	Val	2145	2150	2155	2160
Phe	Ala	Gln	Gln	Met	Ser	Asp	Cys	Ala	Gln	Ala	Leu	Glu	Pro	Tyr	Leu	2165	2170	2175	
Asp	Trp	Ser	Leu	Leu	Asp	Val	Leu	Arg	Gly	Ala	Pro	Asp	Ala	Pro	Pro	2180	2185	2190	
Leu	Gln	Arg	Val	Asp	Val	Val	Gln	Pro	Val	Leu	Phe	Ala	Val	Met	Val	2195	2200	2205	
Ser	Leu	Ala	Ala	Leu	Trp	Arg	Ser	Tyr	Gly	Val	His	Pro	Asp	Ala	Val	2210	2215	2220	
Ala	Gly	His	Ser	Gln	Gly	Glu	Ile	Ala	Ala	Ala	Tyr	Val	Ala	Gly	Ala	2225	2230	2235	2240
Leu	Ser	Leu	Asp	Asp	Ala	Ala	Arg	Val	Thr	Ala	Leu	Arg	Ser	Gln	Ala	2245	2250	2255	
Leu	Ala	Ala	Leu	Ala	Gly	Gln	Gly	Ala	Met	Ala	Ser	Val	Gly	Leu	Pro	2260	2265	2270	
Val	Glu	Lys	Leu	Glu	Pro	Arg	Leu	Ala	Thr	Trp	Gly	Asp	Arg	Leu	Val	2275	2280	2285	
Ile	Ala	Ala	Val	Asn	Gly	Ala	Arg	Ser	Ala	Val	Val	Ser	Gly	Glu	Pro	2290	2295	2300	
Glu	Ala	Val	Asp	Ala	Leu	Val	Glu	Glu	Leu	Ser	His	Glu	Asp	Val	Pro	2305	2310	2315	2320
Ala	Arg	Arg	Leu	Met	Val	Asp	Trp	Ala	Ser	His	Ser	Pro	Gln	Val	Glu	2325	2330	2335	
Ala	Ile	Gln	Gly	Arg	Leu	Leu	Glu	Leu	Leu	Ala	Pro	Ile	Arg	Ala	Arg	2340	2345	2350	
Thr	Gly	Asp	Val	Pro	Phe	Tyr	Ser	Thr	Val	Thr	Gly	Glu	Arg	Ile	Asp	2355	2360	2365	
Gly	Thr	Glu	Leu	Asp	Ala	Asp	Tyr	Trp	Tyr	Arg	Asn	Leu	Arg	Gln	Val	2370	2375	2380	
Val	Arg	Phe	Arg	Asp	Ala	Thr	Gln	Ala	Leu	Val	Arg	Ala	Gly	His	Thr	2385	2390	2395	2400
Val	Phe	Ile	Glu	Ala	Cys	Pro	His	Pro	Ala	Val	Ala	Val	Gly	Val	Gln	2405	2410	2415	
Glu	Thr	Leu	Asp	Glu	Met	Gly	Asp	Leu	Asp	Ser	Leu	Val	Val	Gly	Ser	2420	2425	2430	
Leu	Arg	Arg	Gly	Glu	Gly	Gly	Leu	Arg	Arg	Phe	Leu	Met	Ser	Val	Ala	2435	2440	2445	
Glu	Leu	Phe	Val	Gly	Gly	Val	Ala	Val	Glu	Trp	Ser	Gly	Val	Phe	Gly	2450	2455	2460	

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Ser Val Gly Arg Gly Val Ala Gly Gly Cys Gly Val Glu Leu Pro Thr  
2465 2470 2475 2480

Tyr Ala Phe Glu Arg Glu Arg Phe Trp Leu Asp Val Glu Gly Ala Pro  
2485 2490 2495

Arg Gly Ser Gly Val Ser Gly Gln Trp Gly Gly Gln Leu Ser Glu Ala  
2500 2505 2510

Val Asp Thr Val Arg Gly Gly Met Leu Arg Asp Cys Leu Ala Gly Leu  
2515 2520 2525

Asp Pro Ala Ala Gln Ala Glu Thr Val Leu Asp Leu Val Leu Thr His  
2530 2535 2540

Ala Ala Ala Val Leu Gly His Gly Thr Ala Asp Ala Val Val Pro Glu  
2545 2550 2555 2560

Arg Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu  
2565 2570 2575

Arg Asn Arg Leu Asn Thr Ala Thr Gly Leu Arg Phe Pro Arg Thr Leu  
2580 2585 2590

Val Phe Asp His Pro Arg Pro Val Ala Leu Ala Ala His Ile His Glu  
2595 2600 2605

Gln Leu Ser Gly Gly Ser Pro Thr Thr Gly Thr Ala Leu Ala Leu Ala  
2610 2615 2620

Leu Arg Ala Pro Ala Pro Arg Val Asp Val Asp Glu Pro Ile Ala Ile  
2625 2630 2635 2640

Val Gly Met Ala Cys Arg Phe Pro Gly Gly Val Glu Ser Ala Glu Asp  
2645 2650 2655

Phe Trp Glu Leu Ile Ala Ser Gly Arg Asp Ala Val Gly Glu Phe Pro  
2660 2665 2670

Val Asp Arg Gly Trp Asp Val Glu Ala Phe Tyr Asp Pro Glu Pro Gly  
2675 2680 2685

Arg Ala Gly Thr Ser Tyr Thr Arg Cys Gly Gly Phe Leu Gln Gly Ala  
2690 2695 2700

Ala Glu Phe Asp Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu  
2705 2710 2715 2720

Ala Met Asp Pro Gln Gln Arg Leu Met Leu Glu Val Ser Trp Glu Ala  
2725 2730 2735

Leu Glu Arg Ala Gly Ile Asp Pro Ala Thr Leu His Gly Ser Thr Thr  
2740 2745 2750

Gly Val Phe Ala Gly Val Ser Gln Gln Asp Tyr Ala Glu Leu Leu Arg  
2755 2760 2765

Arg Gly Thr Gln Asp His Glu Gly Tyr Ala Leu Thr Gly Val Ser Asn  
2770 2775 2780

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Ser Val Val Ser Gly Arg Leu Ser Tyr Thr Phe Gly Phe Glu Gly Pro  
2785 2790 2795 2800

Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His  
2805 2810 2815

Leu Ala Cys Gln Ala Leu Arg Ser Gly Glu Cys Ser Leu Ala Leu Ala  
2820 2825 2830

Gly Gly Val Thr Val Met Ser Thr Pro Gly Ala Phe Val Glu Phe Ser  
2835 2840 2845

Arg Gln Arg Gly Leu Ser Pro Asp Gly Arg Cys Lys Ala Tyr Gly Ser  
2850 2855 2860

Gly Ala Asp Gly Val Gly Trp Ala Glu Gly Val Gly Val Leu Leu Val  
2865 2870 2875 2880

Glu Arg Leu Ser Glu Ala Glu Arg Arg Gly His Arg Val Leu Ala Val  
2885 2890 2895

Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr  
2900 2905 2910

Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala  
2915 2920 2925

Cys Ala Gly Leu Ser Val Ala Asp Val Asp Val Val Glu Gly His Gly  
2930 2935 2940

Thr Gly Thr Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala  
2945 2950 2955 2960

Thr Tyr Gly Gln Gly Arg Ser Gly Glu Arg Pro Val Trp Leu Gly Ser  
2965 2970 2975

Val Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala Gly Val Ala Gly  
2980 2985 2990

Val Ile Lys Met Val Met Ala Leu Asn His Glu Leu Leu Pro Thr Ser  
2995 3000 3005

Leu His Ile Asp Glu Pro Ser Pro His Ile Asp Trp Ser Ser Gly Gly  
3010 3015 3020

Val Arg Leu Leu Thr Glu Pro Val Pro Trp Gln Gln Asn Gly Arg Pro  
3025 3030 3035 3040

Arg Arg Ala Gly Val Ser Ala Phe Gly Val Ser Gly Thr Asn Ala His  
3045 3050 3055

Val Ile Ile Glu Gln Ala Pro Val Glu Ala His Val Ile Ser Glu Pro  
3060 3065 3070

Val Pro Ala Glu Ala His Val Ile Val Glu Gln Ala Pro Val Glu Ala  
3075 3080 3085

Pro His Val Val Asp Ala Thr Gly Pro Ala Asp Leu Thr Glu Pro Gln  
3090 3095 3100

Glu Glu Ala Ala Glu Pro Glu Cys Val Ala Asp Ala Val Thr Glu Met  
3105 3110 3115 3120

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Ser Ala Glu Pro Glu Cys Val Ala Asp Ala Met Ser Glu Met Ser Ala  
3125 3130 3135

Glu Cys Val Ala Glu Ala Val Ser Asp Lys Ser Ala Glu Pro Glu Cys  
3140 3145 3150

Val Ala Asp Ala Met Ser Asp Lys Pro Ala Leu Leu Pro Ile Pro Trp  
3155 3160 3165

Leu Leu Ser Ala Lys Ser Glu Arg Ala Leu Arg Gly Gln Ala Arg Arg  
3170 3175 3180

Leu Arg Gln Phe Ala Ala Arg Ala Ser Asp Ala Arg Pro Ala Asp Val  
3185 3190 3195 3200

Ala His Ala Leu Ala Ala Gln Arg Ser Val Phe Asp His Arg Ala Val  
3205 3210 3215

Val Val Ala Glu Asp Arg Asp Gly Phe Leu Gln Ala Leu Asp Ala Leu  
3220 3225 3230

Ala Glu Gly Arg Ser Ala Asp Gly Leu Ile Glu Gly Ser Val Gly Pro  
3235 3240 3245

Arg Gly Gly His Ser Gly Arg Arg Arg Gly Lys Thr Ala Met Leu Phe  
3250 3255 3260

Ala Gly Gln Gly Thr Gln Arg Val Gly Met Gly Arg Gln Leu Tyr Ala  
3265 3270 3275 3280

Ala His Pro Ala Tyr Ala Asp Ala Leu Asp Gln Val Leu Ala Glu Leu  
3285 3290 3295

Asp Gly His Leu Asp Gln Pro Leu Arg Pro Leu Ile His Ala Ser Ala  
3300 3305 3310

Asp Leu Ala Asp Val Ala Asp Ala Ala Asp Val Leu Asp Arg Thr Arg  
3315 3320 3325

Tyr Ala Gln Pro Ala Leu Phe Ala Val Gln Val Ala Leu Phe Arg His  
3330 3335 3340

Leu Glu Arg Leu Gly Val Arg Ala Asp Phe Val Ala Gly His Ser Ile  
3345 3350 3355 3360

Gly Glu Leu Ala Ala Ala His Val Ala Gly Val Leu Pro Leu Ala Ala  
3365 3370 3375

Ala Cys Arg Leu Val Ala Ala Arg Gly Arg Leu Met Glu Gln Leu Ala  
3380 3385 3390

Pro Gly Gly Ala Met Val Ala Val Arg Ala Ser Glu Ala Glu Ala Arg  
3395 3400 3405

Gln Ala Leu Asp Gly Arg Glu Ala Arg Val Ser Val Ala Ala Val Asn  
3410 3415 3420

Gly Pro Ala Ser Val Val Phe Ser Gly Ala Glu Asp Glu Val Gly Asn  
3425 3430 3435 3440

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Met Ala Asp Trp Phe Ala Glu Arg Gly Arg Arg Val Lys Arg Leu Arg  
3445 3450 3455

Thr Gly His Ala Phe His Ser Pro Leu Met Asp Pro Met Leu Glu Glu  
3460 3465 3470

Phe Gln Gln Val Ala Ala Ser Leu Thr Tyr Ser Glu Pro Ala Ile Pro  
3475 3480 3485

Met Val Ser Thr Leu Thr Gly Asp Ile Val Ala Ala Gly Glu Leu Ser  
3490 3495 3500

Asp Pro Glu Tyr Trp Val Arg Gln Val Arg Arg Thr Val Arg Phe Gly  
3505 3510 3515 3520

Asp Ala Ile Ser Arg Leu His Thr Asp Gly Val Arg Thr Phe Met Glu  
3525 3530 3535

Leu Gly Pro Asp Gly Thr Leu Ser Ala Leu Ala Glu Glu Cys Leu Glu  
3540 3545 3550

Ala Thr Ala Asp Ser His Pro Ala Asp Asp Asp Thr Gly Thr Pro Gln  
3555 3560 3565

Glu Asn Leu Leu Ile Pro Leu Leu Arg Pro Asp Ser Pro Glu Pro Gly  
3570 3575 3580

Thr Leu Leu Thr Gly Leu Ala Arg Leu His Thr His Gly Ala Ala Ala  
3585 3590 3595 3600

Val Asn Trp Pro Ala Ala Leu Pro Glu Arg Asp Arg Ala Arg His Leu  
3605 3610 3615

Asp Leu Pro Thr Tyr Ala Phe Asp His His Arg Tyr Trp Val Asp Thr  
3620 3625 3630

Ser Ala Gly His Pro Gly Asp Leu Ser Ala Ala Gly Leu Gly Thr Ala  
3635 3640 3645

Gly His Pro Leu Leu Gly Ser Ala Val Ala Leu Ala Glu Ser Gln Glu  
3650 3655 3660

Leu Leu Phe Thr Gly Arg Leu Ser Leu Arg Thr His Pro Trp Leu Ala  
3665 3670 3675 3680

Asp His Ala Ile Phe Gly Thr Val Leu Leu Pro Gly Thr Ala Ile Leu  
3685 3690 3695

Glu Leu Ala Val Arg Ala Gly Asp Glu Val Asp Cys Gly Thr Val Glu  
3700 3705 3710

Glu Leu Thr Leu Arg Thr Pro Leu Val Leu Pro Glu Gln Gly Ser Val  
3715 3720 3725

Ile Leu Gln Leu Ser Val Gly Ala Pro Gln Gly Pro Gln Thr Pro Glu  
3730 3735 3740

Glu Pro Glu Arg Arg Thr Phe Ala Leu Tyr Ala Arg Glu Asp Asp Gly  
3745 3750 3755 3760

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Leu Ser Ser Ser Ser Ala Ala Ala Thr Gly Thr Glu Trp Thr Cys His  
 3765 3770 3775  
 Ala Thr Gly Val Leu Thr Gly Thr Ala Arg Pro Ala Glu Glu His Thr  
 3780 3785 3790  
 Gln Glu Pro Trp Pro Pro Ala Asp Ala Ala Pro Val Asp Leu Asp Gly  
 3795 3800 3805  
 Trp Tyr Glu Gln Leu Ala Gly Ala Gly Leu Gly Tyr Gly Pro Val Phe  
 3810 3815 3820  
 Gln Gly Leu Arg Glu Val Trp Arg Arg Gly Asp Glu Val Phe Ala Val  
 3825 3830 3835 3840  
 Val Thr Leu Pro Glu Ser Thr Glu Gly Gln Ala Ala Asp Ala Ala Arg  
 3845 3850 3855  
 Tyr Ala Leu His Pro Ala Leu Leu Asp Ala Ala Leu His Pro Val Val  
 3860 3865 3870  
 Leu Arg His Glu Gly Asp Ala Ala Ala Asp Gly His Gly Trp Leu Pro  
 3875 3880 3885  
 Phe Ser Trp Thr Gly Val Thr Val Ala Ala Ser Gly Ala Ser Thr Leu  
 3890 3895 3900  
 His Val Arg Leu Thr Val Arg Thr Asp Glu Asp Ala Val Gly Leu Leu  
 3905 3910 3915 3920  
 Ala Thr Asp Ala Ser Gly Arg Ile Val Ile Ser Ala Gly Ser Leu Ala  
 3925 3930 3935  
 Phe Arg Pro Val Ser Ala Glu Gln Leu Gln Ala Ala Arg Thr Gly Tyr  
 3940 3945 3950  
 His Asp His Leu Phe Arg Ile Glu Trp Arg Pro Leu His Leu Pro Thr  
 3955 3960 3965  
 Thr Pro Ala Arg Thr Ala Asp Trp Ala Leu Ile Gly Pro Gly Ala Arg  
 3970 3975 3980  
 Arg Thr Ala Ala Val Leu Glu Arg Asn Gly Ala Ser Trp Gln Ala Tyr  
 3985 3990 3995 4000  
 Pro Asp Pro Ala Ala Leu Ala Glu Ala Leu Ala Ala Gly Ala Pro Ala  
 4005 4010 4015  
 Pro Gly Met Val Val Ile Ser Cys Glu Pro Asp Gly Ala Ser Ala Pro  
 4020 4025 4030  
 Thr Asp Ser Ala Leu Thr Asp Ser Ala Leu Thr Asp Ser Ala Pro Ala  
 4035 4040 4045  
 Gly Ser Ala Pro Ala Asp Ser Thr Ala Leu Ala Asp Ala Thr Arg Gln  
 4050 4055 4060  
 Ala Thr Thr Arg Val Leu Ala Leu Leu Gln Glu Trp Val Ala Asp Glu  
 4065 4070 4075 4080



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Arg Leu Ala Ala Cys Arg Leu Ala Leu Leu Thr His Gly Ser Val Thr  
4085 4090 4095

Ala Thr Pro Asp Glu Pro Val Ser Asp Leu Ala His Ala Ala Val Trp  
4100 4105 4110

Gly Leu Val Arg Ser Val Gln Thr Glu Asn Pro Asp Arg Phe Leu Leu  
4115 4120 4125

Ala Asp Thr Asp Asp Thr Asp Ala Ser Arg Asn Ala Leu Pro Leu Leu  
4130 4135 4140

Ala Gly Glu Pro Gln Ile Ala Leu Arg Asn Gly Ala Val Arg Ile Pro  
4145 4150 4155 4160

Arg Met Thr Arg Val Pro Val Arg Gln Pro Gln Pro Ser Thr Thr Asp  
4165 4170 4175

Ala Asp Trp Asp Pro Glu Ala Thr Val Leu Ile Thr Gly Gly Thr Gly  
4180 4185 4190

Val Leu Gly Arg Leu Val Ala Arg His Leu Ala Thr Ala His Gly Val  
4195 4200 4205

Arg His Leu Leu Leu Ala Thr Arg Arg Gly Thr Ala Ala Asp Gly Ala  
4210 4215 4220

Ala Asp Leu Val Ala Glu Leu Ala Gly Leu Gly Ala Glu Ala Thr Val  
4225 4230 4235 4240

Ala Ala Cys Asp Ile Gly Asp Arg Ala Ala Val Ala Ala Leu Leu Asp  
4245 4250 4255

Gln Val Pro Ala Gln His Pro Leu Lys Ala Val Ile His Thr Ala Gly  
4260 4265 4270

Val Val Asp Asp Gly Ile Leu Thr Ser Leu Thr Pro Glu Arg Met Glu  
4275 4280 4285

Ala Val Leu His Ala Lys Ala Phe Gly Ala Ala His Leu His Asp Leu  
4290 4295 4300

Thr Arg Asp Ala Gly Leu Thr Thr Phe Thr Val Phe Ser Ser Ala Ala  
4305 4310 4315 4320

Ala Ser Phe Gly Ser Pro Gly Gln Gly Asn Tyr Thr Ala Ala Asn Ala  
4325 4330 4335

Phe Leu Asp Ala Leu Met Gln His Arg His Thr Gln Ala Leu Pro Gly  
4340 4345 4350

Arg Ser Leu Ala Trp Gly Leu Trp Gly Glu Ala Asp Gly Met Thr Arg  
4355 4360 4365

Asn Leu Ala Gly Thr Asp Phe Ala Arg Met Ala Arg Gly Gly Leu Leu  
4370 4375 4380

Pro Leu Ser Asn Ala Gln Gly Leu Ala Leu Leu Asp Thr Ala Asp Arg  
4385 4390 4395 4400



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Thr Arg Met Phe Ala Asp Ala Ile Val Arg Phe Thr Asp Gly Ala Pro  
4725 4730 4735

Phe Ala Leu Ala Gly His Ser Ala Gly Gly Trp Phe Val Tyr Ala Val  
4740 4745 4750

Thr Ser His Leu Glu Arg Leu Gly Val Arg Pro Glu Ala Val Val Thr  
4755 4760 4765

Met Asp Ala Tyr Leu Pro Asp Asp Gly Ile Ala Pro Val Ala Ser Ala  
4770 4775 4780

Leu Thr Ser Glu Ile Phe Asp Arg Val Thr Gln Phe Val Asp Val Asp  
4785 4790 4795 4800

Tyr Thr Arg Leu Val Ala Met Gly Gly Tyr Phe Arg Ile Phe Ser Gly  
4805 4810 4815

Trp Ser Pro Pro Asp Ile Thr Thr Pro Ala Leu Phe Leu Arg Gly Arg  
4820 4825 4830

Asp Gly Glu Gln Met Pro Pro Pro Trp Gly Val Pro His Thr Val Leu  
4835 4840 4845

Asp Ile Gln Gly Asn His Phe Thr Met Leu Glu Gln Phe Ala Asp Ser  
4850 4855 4860

Thr Ala Arg His Val Asp Glu Trp Leu Thr Glu Ile Ala Ser Val Arg  
4865 4870 4875 4880

Arg

<210> 6

<211> 5532

<212> PRT

<213> Streptomyces avermitilis

<400> 6

Met Asp Thr Ser Ser Glu Lys Leu Val Asp Ala Leu Arg Ala Ser Leu  
1 5 10 15

Lys Ala Asn Gln Thr Leu Arg Ala Arg Asn Glu Gln Leu Ala Ala Ala  
20 25 30

Met Glu Ala Ser Ser Glu Pro Ile Ala Ile Val Gly Met Ala Cys Arg  
35 40 45

Phe Pro Gly Gly Val Cys Ser Pro Glu Glu Leu Trp Glu Leu Val Ala  
50 55 60

Ser Gly Gly Asp Ala Ile Gly Glu Phe Pro Ala Gly Arg Gly Trp Asp  
65 70 75 80

Leu Glu Gly Leu Phe Asp Ser Asp Pro Asp Arg Ser Gly Thr Ser Tyr  
85 90 95

Ala Arg Tyr Gly Gly Phe Leu Tyr Glu Ala Gly Glu Phe Asp Ala Asp  
100 105 110

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Phe	Phe	Gly	Ile	Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln
		115					120					125			
Arg	Leu	Leu	Leu	Glu	Thr	Ser	Trp	Glu	Ala	Phe	Glu	Arg	Ala	Gly	Ile
	130					135					140				
Asp	Pro	Leu	Ser	Met	Arg	Gly	Ser	Arg	Thr	Gly	Val	Phe	Ala	Gly	Val
145					150					155					160
Met	Tyr	His	Asp	Tyr	Gly	Ser	Arg	Leu	Gly	Thr	Ile	Pro	Glu	Gly	Phe
				165					170					175	
Glu	Gly	Tyr	Ile	Gly	Asn	Gly	Ser	Gly	Gly	Ala	Val	Ala	Ser	Gly	Arg
			180					185					190		
Val	Ala	Tyr	Thr	Leu	Gly	Leu	Glu	Gly	Pro	Ala	Val	Ser	Val	Asp	Thr
		195					200					205			
Ala	Cys	Ser	Ser	Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Cys	Gln	Ser	Leu
	210					215					220				
Arg	Ser	Gly	Glu	Cys	Thr	Leu	Ala	Leu	Ala	Gly	Gly	Val	Thr	Val	Met
225					230					235					240
Ser	Thr	Pro	His	Leu	Phe	Val	Glu	Phe	Ser	Arg	Gln	Arg	Gly	Leu	Ser
				245					250					255	
Val	Asp	Gly	Arg	Cys	Lys	Ser	Phe	Ala	Gly	Gly	Ala	Asp	Gly	Thr	Gly
			260					265					270		
Met	Gly	Glu	Gly	Val	Gly	Met	Leu	Leu	Val	Glu	Arg	Leu	Ser	Asp	Ala
		275					280					285			
Val	Arg	Leu	Gly	His	Arg	Val	Leu	Ala	Val	Leu	Arg	Gly	Ser	Ala	Val
	290					295					300				
Asn	Gln	Asp	Gly	Ala	Ser	Asn	Gly	Leu	Thr	Ala	Pro	Asn	Gly	Pro	Ala
305					310					315					320
Gln	Glu	Arg	Val	Ile	Arg	Gln	Ala	Leu	Ala	Asn	Ala	Gly	Leu	Ser	Val
				325					330					335	
Ala	Asp	Val	Asp	Val	Val	Glu	Gly	His	Gly	Thr	Gly	Thr	Thr	Leu	Gly
			340					345					350		
Asp	Pro	Ile	Glu	Ala	Gln	Ala	Leu	Leu	Ala	Thr	Tyr	Gly	Gln	Arg	Ala
		355					360					365			
Gly	Asn	Arg	Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His
	370					375					380				
Ala	Gln	Ala	Ala	Ala	Gly	Val	Gly	Gly	Val	Ile	Lys	Met	Val	Met	Ala
385					390					395					400
Leu	Arg	Glu	Gly	Val	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Glu	Pro	Ser
				405					410					415	
Pro	Gln	Val	Asp	Trp	Ser	Ala	Gly	Ala	Val	Arg	Leu	Leu	Thr	Glu	Ala
				420				425					430		

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Val	Pro	Trp	Pro	Gly	Asp	Ala	Ala	Gly	Arg	Leu	Arg	Arg	Ala	Gly	Val
	435						440					445			
Ser	Ser	Phe	Gly	Val	Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Glu
	450					455					460				
Ala	Pro	Ala	Ala	Gly	Gly	Cys	Val	Ala	Gly	Gly	Gly	Val	Leu	Glu	Gly
465					470					475					480
Ala	Pro	Gly	Leu	Ala	Ile	Ser	Val	Ala	Glu	Ser	Val	Ala	Ala	Pro	Val
				485					490					495	
Ala	Val	Ser	Ala	Pro	Val	Ala	Glu	Ser	Val	Pro	Val	Pro	Val	Pro	Val
			500					505					510		
Pro	Val	Pro	Val	Pro	Val	Ser	Ala	Arg	Ser	Glu	Ala	Gly	Leu	Arg	Ala
	515						520					525			
Gln	Ala	Glu	Ala	Leu	Arg	Gln	Tyr	Val	Ala	Val	Arg	Pro	Asp	Val	Ser
	530					535						540			
Leu	Ala	Asp	Val	Gly	Ala	Gly	Leu	Ala	Cys	Gly	Arg	Ala	Val	Leu	Glu
545					550					555					560
His	Arg	Ala	Val	Val	Leu	Ala	Ala	Asp	Arg	Glu	Glu	Leu	Val	Gln	Gly
				565					570					575	
Leu	Gly	Ala	Leu	Ala	Ala	Gly	Glu	Pro	Asp	Arg	Arg	Val	Thr	Thr	Gly
			580					585					590		
His	Ala	Pro	Gly	Gly	Asp	Arg	Gly	Gly	Val	Val	Phe	Val	Phe	Pro	Gly
		595					600					605			
Gln	Gly	Gly	Gln	Trp	Ala	Gly	Met	Gly	Val	Arg	Leu	Leu	Ala	Ser	Ser
	610					615					620				
Pro	Val	Phe	Ala	Arg	Arg	Met	Gln	Ala	Cys	Glu	Glu	Ala	Leu	Ala	Pro
625					630					635					640
Trp	Val	Asp	Trp	Ser	Val	Val	Asp	Ile	Leu	Arg	Arg	Asp	Ala	Gly	Asp
				645					650					655	
Ala	Val	Trp	Glu	Arg	Ala	Asp	Val	Val	Gln	Pro	Val	Leu	Phe	Ser	Val
			660						665				670		
Met	Val	Ser	Leu	Ala	Ala	Leu	Trp	Arg	Ser	Tyr	Gly	Ile	Glu	Pro	Asp
		675					680					685			
Ala	Val	Leu	Gly	His	Ser	Gln	Gly	Glu	Ile	Ala	Ala	Ala	His	Val	Cys
	690					695					700				
Gly	Ala	Leu	Ser	Leu	Lys	Asp	Ala	Ala	Lys	Thr	Val	Ala	Leu	Arg	Ser
705					710					715					720
Arg	Ala	Leu	Ala	Ala	Val	Arg	Gly	Arg	Gly	Gly	Met	Ala	Ser	Val	Pro
				725					730					735	
Leu	Pro	Ala	Gln	Glu	Val	Glu	Gln	Leu	Ile	Gly	Glu	Arg	Trp	Ala	Gly
			740					745					750		

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Arg	Leu	Trp	Val	Ala	Ala	Val	Asn	Gly	Pro	Arg	Ser	Thr	Ala	Val	Ser
	755						760					765			
Gly	Asp	Ala	Glu	Ala	Val	Asp	Glu	Val	Leu	Ala	Tyr	Cys	Ala	Gly	Thr
	770					775					780				
Gly	Val	Arg	Ala	Arg	Arg	Ile	Pro	Val	Asp	Tyr	Ala	Ser	His	Cys	Pro
785					790					795					800
His	Val	Gln	Pro	Leu	Arg	Glu	Glu	Leu	Leu	Glu	Leu	Leu	Gly	Asp	Ile
				805					810					815	
Ser	Pro	Gln	Pro	Ser	Gly	Val	Pro	Phe	Phe	Ser	Thr	Val	Glu	Gly	Thr
			820					825					830		
Trp	Leu	Asp	Thr	Thr	Thr	Leu	Asp	Ala	Ala	Tyr	Trp	Tyr	Arg	Asn	Leu
		835					840					845			
His	Gln	Pro	Val	Arg	Phe	Ser	Asp	Ala	Val	Gln	Ala	Leu	Ala	Asp	Asp
	850					855					860				
Gly	His	Arg	Val	Phe	Val	Glu	Val	Ser	Pro	His	Pro	Thr	Leu	Val	Pro
865					870					875					880
Ala	Ile	Glu	Asp	Thr	Thr	Glu	Asp	Thr	Ala	Glu	Asp	Val	Thr	Ala	Ile
				885					890					895	
Gly	Ser	Leu	Arg	Arg	Gly	Asp	Asn	Asp	Thr	Arg	Arg	Phe	Leu	Thr	Ala
			900					905					910		
Leu	Ala	His	Thr	His	Thr	Thr	Gly	Ile	Gly	Thr	Pro	Thr	Thr	Trp	His
		915					920					925			
His	His	Tyr	Thr	His	His	His	Thr	His	Pro	His	Asn	His	His	Leu	Asp
	930					935					940				
Leu	Pro	Thr	Tyr	Pro	Phe	Gln	Arg	Gln	His	Tyr	Trp	Leu	Asp	Ala	Pro
945					950					955					960
Thr	Gly	Ala	Gly	Asp	Val	Ala	Ala	Ala	Gly	Leu	Glu	Pro	Ala	Glu	His
				965					970					975	
Pro	Leu	Leu	Ala	Ala	Thr	Val	Gln	Leu	Ala	Asp	Thr	Asp	Gly	Cys	Leu
			980					985					990		
Leu	Thr	Gly	Arg	Leu	Ser	Leu	Arg	Ser	His	Pro	Trp	Leu	Gly	Asp	Tyr
		995					1000					1005			
Glu	Val	Gly	Gly	Ala	Val	Leu	Leu	Ser	Gly	Ser	Ala	Phe	Val	Glu	Leu
	1010					1015					1020				
Ala	Val	Gln	Val	Gly	Glu	Arg	Val	Gly	Cys	Thr	Arg	Ile	Glu	Gln	Leu
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Thr	Val	His	Ala	Pro	Leu	Val	Val	Pro	Val	Gly	Gly	Gly	Val	Ser	Val
				1045					1050					1055	
Gln	Val	Gly	Val	Ala	Ala	Ala	Asp	Gly	Glu	Gly	Arg	Arg	Leu	Val	Ser
			1060					1065					1070		

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Val Tyr Ala Arg Gly Gly Ser Ala Cys Gly Gly Gly Gly Ala Ser Gly  
1075 1080 1085

Gly Val Trp Thr Cys His Ala Ser Gly Val Leu Val Glu Ala Ala Ala  
1090 1095 1100

Gly Gly Gly Val Val Val Asp Gly Leu Ala Gly Val Trp Pro Pro Arg  
1105 1110 1115 1120

Gly Ala Val Ala Val Asp Val Asp Gly Val Arg Asp Arg Leu Ala Gly  
1125 1130 1135

Ala Gly Cys Val Leu Gly Pro Val Phe Ser Gly Leu Arg Ala Val Trp  
1140 1145 1150

Arg Asp Gly Gly Asp Leu Leu Ala Glu Val Cys Leu Pro Glu Glu Ala  
1155 1160 1165

Trp Gly Asp Ala Ala Gly Phe Gly Leu His Pro Ala Leu Leu Asp Gly  
1170 1175 1180

Val Val Gln Pro Leu Ser Val Leu Leu Pro Gly Gly Thr Gly Phe Gly  
1185 1190 1195 1200

Glu Gly Ala Gly Phe Gly Glu Gly Val Arg Val Pro Ala Val Trp Gly  
1205 1210 1215

Gly Val Ser Leu His Arg Ala Gly Val Thr Gly Val Arg Val Arg Val  
1220 1225 1230

Trp Ala Val Gly Arg Gly Gly Gly Arg Glu Ala Val Ser Val Val Val  
1235 1240 1245

Gly Asp Glu Ala Gly Val Pro Val Ala Ser Val Asp Arg Leu Glu Leu  
1250 1255 1260

Arg Pro Val Asp Met Gly Gln Leu Arg Ala Val Ser Val Ser Ala Gly  
1265 1270 1275 1280

Arg Arg Gly Ser Leu Tyr Ala Val Gln Trp Ala Glu Val Gly Pro Val  
1285 1290 1295

Pro Val Cys Gly Gln Ala Trp Ala Trp His Glu Asp Val Gly Glu Ser  
1300 1305 1310

Gly Gly Gly Pro Val Pro Gly Val Val Val Leu Arg Cys Pro Asp Ala  
1315 1320 1325

Gly Ala Gly Gly Gly Gly Gly Gly Gly Val Gly Glu Val Val Gly Gly  
1330 1335 1340

Val Leu Gly Val Val Gln Gly Trp Leu Gly Leu Glu Arg Phe Ala Gly  
1345 1350 1355 1360

Ser Arg Leu Val Val Val Thr Arg Gly Ala Val Val Ala Gly Gln Glu  
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Asp Gly Pro Val Asp Val Val Gly Ala Ala Val Trp Gly Leu Val Arg  
1380 1385 1390

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Ser Ala Gln Ala Glu His Pro Asp Arg Phe Val Leu Leu Asp Leu Asp  
1395 1400 1405

Thr Asp Thr Asp Thr Gly Thr Asp Leu Asp Thr Gly Ala Gly Ala Gly  
1410 1415 1420

Ala Gly Ala Gly Trp Gly Val Asp Gly Gly His Val Ala Ala Val Val  
1425 1430 1435 1440

Ala Cys Gly Glu Pro Gln Leu Ala Val Arg Gly Glu Arg Val Leu Ala  
1445 1450 1455

Ala Arg Leu Thr Arg Leu Glu Ser Ser Val Asp Val Pro Ala Gln Arg  
1460 1465 1470

Ser Gly Asp Val Ala Gly Arg Glu Val Leu Pro Trp Leu Ser Gly Gly  
1475 1480 1485

Ser Val Leu Val Thr Gly Gly Thr Gly Val Leu Gly Ala Ala Val Ala  
1490 1495 1500

Arg His Leu Ala Gly Val Cys Gly Val Arg Asp Leu Leu Leu Val Ser  
1505 1510 1515 1520

Arg Arg Gly Pro Asp Ala Pro Gly Ala Glu Gly Leu Arg Ala Glu Leu  
1525 1530 1535

Ala Ala Leu Gly Ala Glu Val Arg Ile Val Ala Cys Asp Val Gly Glu  
1540 1545 1550

Arg Arg Glu Val Val Arg Leu Leu Glu Gly Val Pro Ala Gly Cys Pro  
1555 1560 1565

Leu Thr Gly Val Val His Ala Ala Gly Val Leu Asp Asp Ala Thr Ile  
1570 1575 1580

Ala Ser Leu Thr Pro Glu Arg Leu Gly Thr Val Phe Ala Ala Lys Val  
1585 1590 1595 1600

Asp Ala Ala Leu Leu Leu Asp Glu Leu Thr Arg Gly Met Glu Leu Ser  
1605 1610 1615

Ala Phe Val Leu Phe Ser Ser Ala Ala Gly Ile Leu Gly Ser Ala Gly  
1620 1625 1630

Gln Gly Asn Tyr Ala Ala Ala Asn Ala Ala Leu Asp Ala Leu Ala Tyr  
1635 1640 1645

Arg Arg Arg Ala Ala Gly Leu Pro Gly Val Ser Leu Ala Trp Gly Leu  
1650 1655 1660

Trp Glu Glu Ala Ser Gly Met Thr Gly His Leu Ala Gly Thr Asp His  
1665 1670 1675 1680

Arg Arg Ile Ile Arg Ser Gly Leu His Pro Met Ser Thr Pro Asp Ala  
1685 1690 1695

Leu Ala Leu Phe Asp Ala Ala Leu Ala Leu Asp Arg Pro Val Leu Leu  
1700 1705 1710



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Pro Ala Asp Leu Arg Pro Ala Pro Pro Leu Pro Pro Leu Leu Gln Asp  
1715 1720 1725

Leu Leu Pro Ala Thr Arg Arg Arg Thr Thr Arg Thr Thr Thr Thr Gly  
1730 1735 1740

Gly Ala Asp Asn Gly Ala Gln Leu His Ala Arg Leu Ala Gly Gln Thr  
1745 1750 1755 1760

His Glu Gln Gln His Thr Thr Leu Leu Ala Leu Val Arg Ser His Ile  
1765 1770 1775

Ala Thr Val Leu Gly His Thr Thr Pro Asp Thr Ile Pro Pro Asp Arg  
1780 1785 1790

Ala Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg  
1795 1800 1805

Asn Arg Leu Ser Arg Thr Thr Gly Leu Arg Leu Pro Thr Thr Leu Ala  
1810 1815 1820

Phe Asp His Pro Asn Pro Thr Thr Leu Thr His His Leu His Thr Gln  
1825 1830 1835 1840

Leu Leu Gly Ser Asp Ser Thr Ala Ser Ile Pro Ala Pro Arg Ala Ala  
1845 1850 1855

Ala Val Pro Ala Asp Gln Asp Glu Pro Val Ala Ile Ile Gly Met Ala  
1860 1865 1870

Cys Arg Tyr Pro Gly Gly Val Thr Ser Ala Glu Glu Leu Trp Glu Leu  
1875 1880 1885

Leu Ala Ser Gly Arg Asp Thr Val Gly Glu Phe Pro Thr Asp Arg Gly  
1890 1895 1900

Trp Asp Leu Glu Ala Leu Phe Asp Pro Glu Pro Gly Arg Pro Gly Thr  
1905 1910 1915 1920

Ser Tyr Thr Arg Cys Gly Ser Phe Leu Tyr Asp Ala Gly Glu Phe Asp  
1925 1930 1935

Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met Asp Pro  
1940 1945 1950

Gln Gln Arg Leu Leu Leu Glu Ala Ser Trp Glu Ala Met Glu Gln Ala  
1955 1960 1965

Gly Ile Asp Pro Thr Thr Val Arg Gly Ser Gln Thr Gly Val Phe Ala  
1970 1975 1980

Gly Leu Ile Pro Gln Ala Tyr Gly Pro Arg Leu His Glu Asn Ala Ala  
1985 1990 1995 2000

Ala Asp Thr Glu Gly Tyr Val Leu Thr Gly Thr Ser Gly Ser Val Ala  
2005 2010 2015

Ser Gly Arg Ile Ser Tyr Thr Phe Gly Phe Glu Gly Pro Ala Val Ser  
2020 2025 2030

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Val Asp Thr Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Cys  
2035 2040 2045

Gln Ala Leu Arg Ala Gly Glu Cys Ser Met Ala Leu Ala Gly Gly Val  
2050 2055 2060

Thr Val Met Ser Ser Pro Gly Ala Phe Val Glu Phe Ser Arg Gln Arg  
2065 2070 2075 2080

Gly Leu Ala Ala Asp Gly His Cys Lys Ala Phe Ser Ala Ala Ala Asp  
2085 2090 2095

Gly Thr Gly Trp Gly Glu Gly Val Gly Met Leu Leu Val Glu Arg Leu  
2100 2105 2110

Ser Asp Ala Arg Arg Asn Gly His Arg Val Leu Ala Val Val Arg Gly  
2115 2120 2125

Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn  
2130 2135 2140

Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asn Ala Gly  
2145 2150 2155 2160

Leu Ser Ala Gly Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr  
2165 2170 2175

Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly  
2180 2185 2190

Gln Asp Arg Ala Gly Glu Gly Pro Leu Trp Leu Gly Ser Val Lys Ser  
2195 2200 2205

Asn Val Gly His Thr Gln Ala Ala Ala Gly Val Ala Gly Val Ile Lys  
2210 2215 2220

Met Val Met Ala Leu Arg Asn Gly Leu Leu Pro Arg Thr Leu His Val  
2225 2230 2235 2240

Asp Glu Pro Ser Pro His Val Asp Trp Ser Ala Gly Ala Val Gln Leu  
2245 2250 2255

Leu Thr Glu Thr Val Pro Trp Pro Gly Gly Glu Gly Arg Leu Arg Arg  
2260 2265 2270

Ala Gly Val Ser Ser Phe Gly Val Ser Gly Thr Asn Ala His Val Ile  
2275 2280 2285

Leu Glu Glu Ala Pro Ala His Asn Ile Pro Ser Asp Thr Pro Ala Asp  
2290 2295 2300

Asp Val Pro Gly Gly Pro Pro Ala Gly Glu Asp Ala Gly Ser Gly Glu  
2305 2310 2315 2320

Glu Ala Ala Ala Gly Ser Pro Gly Val Trp Pro Trp Leu Val Ser Ala  
2325 2330 2335

Lys Ser Gln Pro Ala Leu Arg Ala Gln Ala Gln Ala Leu His Ala His  
2340 2345 2350

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Leu Thr Asp His Pro Gly Leu Asp Leu Ala Asp Val Gly Tyr Thr Leu  
2355 2360 2365

Ala His Ala Arg Ala Val Phe Asp His Arg Ala Thr Leu Ile Ala Ala  
2370 2375 2380

Asp Arg Asp Thr Phe Leu Gln Ala Leu Gln Ala Leu Ala Ala Gly Glu  
2385 2390 2395 2400

Pro His Pro Ala Val Ile His Ser Ser Ala Pro Gly Gly Thr Gly Thr  
2405 2410 2415

Gly Glu Ala Ala Gly Lys Thr Ala Phe Ile Cys Ser Gly Gln Gly Thr  
2420 2425 2430

Gln Arg Pro Gly Met Ala His Gly Leu Tyr His Thr His Pro Val Phe  
2435 2440 2445

Ala Ala Ala Leu Asn Asp Ile Cys Thr His Leu Asp Pro His Leu Asp  
2450 2455 2460

His Pro Leu Leu Pro Leu Leu Thr Gln Asp Pro Asn Thr Gln Asp Thr  
2465 2470 2475 2480

Thr Thr Leu Glu Glu Ala Ala Ala Leu Leu Gln Gln Thr Pro Tyr Ala  
2485 2490 2495

Gln Pro Ala Leu Phe Ala Phe Gln Val Ala Leu His Arg Leu Leu Thr  
2500 2505 2510

Asp Gly Tyr His Ile Thr Pro His Tyr Tyr Ala Gly His Ser Leu Gly  
2515 2520 2525

Glu Ile Thr Ala Ala His Leu Ala Gly Ile Leu Thr Leu Thr Asp Ala  
2530 2535 2540

Thr Thr Leu Ile Thr Gln Arg Ala Thr Leu Met Gln Thr Met Pro Pro  
2545 2550 2555 2560

Gly Thr Met Thr Thr Leu His Thr Thr Pro His His Ile Thr His His  
2565 2570 2575

Ile Thr Ala His Glu Asn Asp Leu Ala Ile Ala Ala Ile Asn Thr Pro  
2580 2585 2590

Thr Ser Leu Val Ile Ser Gly Thr Pro His Thr Val Gln His Ile Thr  
2595 2600 2605

Thr Leu Cys Gln Gln Gln Gly Ile Lys Thr Lys Thr Leu Pro Thr Asn  
2610 2615 2620

His Ala Phe His Ser Pro His Thr Asn Pro Ile Leu Asn Gln Leu His  
2625 2630 2635 2640

Gln His Thr Gln Thr Leu Thr Tyr His Pro Pro His Thr Pro Leu Ile  
2645 2650 2655

Thr Ala Asn Thr Pro Pro Asp Gln Leu Leu Thr Pro His Tyr Trp Thr  
2660 2665 2670

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Gln Gln Ala Arg Asn Thr Val Asp Ile Ala Thr Thr Thr Gln Thr Leu  
2675 2680 2685

His Gln His Gly Val Thr Thr Tyr Ile Glu Leu Gly Pro Asp Asn Thr  
2690 2695 2700

Leu Thr Thr Leu Thr His His Asn Leu Pro Asn Thr Pro Thr Thr Thr  
2705 2710 2715 2720

Leu Thr Leu Thr His Pro His His His Pro Gln Thr His Leu Leu Thr  
2725 2730 2735

Asn Leu Ala Lys Thr Thr Thr Thr Trp His Pro His His Tyr Thr His  
2740 2745 2750

His His Asn Gln Pro His Thr His Thr His Leu Asp Leu Pro Thr Tyr  
2755 2760 2765

Pro Phe Gln His His His Tyr Trp Leu Glu Ser Thr Gln Pro Gly Ala  
2770 2775 2780

Gly Asn Val Ser Ala Ala Gly Leu Asp Pro Thr Glu His Pro Leu Leu  
2785 2790 2795 2800

Gly Ala Thr Leu Glu Leu Ala Glu Gly Asp Gly Cys Leu Leu Thr Gly  
2805 2810 2815

Arg Leu Ser Leu Arg Thr His Pro Trp Leu Ala Gly His Ala Val Gly  
2820 2825 2830

Gly Val Val Leu Leu Pro Gly Thr Ala Phe Ala Glu Leu Ala Leu His  
2835 2840 2845

Ala Gly Glu Ser Val Gly Cys Asp His Val Asp Glu Leu Thr Leu His  
2850 2855 2860

Thr Pro Leu Val Ile Pro Glu Val Gly Asp Val Thr Leu Gln Val Ala  
2865 2870 2875 2880

Ile Ala Ala Pro Asp Glu Ser Gly Arg Arg Met Met Thr Ile His Ser  
2885 2890 2895

Arg Gly Glu Gly Gly Ser Gly Gly Ala Asp Ala Ser Ala Ser Ala Trp  
2900 2905 2910

Thr Arg His Ala Ala Gly Val Leu Ser Pro Ala Lys Asp Asp Asp Thr  
2915 2920 2925

Ala Ser Tyr Glu Leu Leu Ala Gly Pro Trp Pro Pro Val Gly Ala Thr  
2930 2935 2940

Pro Val Asp Leu Asn Thr Ala Tyr Asp Gln Met Ala Asp Ala Gly Phe  
2945 2950 2955 2960

Ala Tyr Gly Leu Ala Phe Gln Gly Leu Arg Ala Ala Trp Arg Tyr Gly  
2965 2970 2975

Asp Asp Ile Leu Val Glu Ala Arg Leu Pro Glu Glu Val Ser Gly Asp  
2980 2985 2990

104280" 9824T660

Ala Ala Ala Tyr Gly Leu His Pro Ala Leu Leu Asp Ala Ala Leu Gln  
 2995 3000 3005

Gly Thr Gly Leu Leu Ser Val Ala Gly Pro Gly Thr Pro Val Val Pro  
 3010 3015 3020

His Val Trp Asn Gly Leu Arg Phe Arg Thr His Gly Ala Val Ser Val  
 3025 3030 3035 3040

Arg Ala Cys Leu Ser Thr Leu Gly Ala Thr Gly Ala Ala Val Cys Val  
 3045 3050 3055

Arg Ile Thr Asp Asp Thr Gly Val Pro Val Ala Ser Val Asp Arg Leu  
 3060 3065 3070

Glu Leu Arg Pro Val Asp Met Gly Gln Leu Arg Ala Val Ser Val Ser  
 3075 3080 3085

Ala Gly Arg Arg Gly Ser Leu Tyr Ala Val Gln Trp Ala Glu Val Gly  
 3090 3095 3100

Pro Val Pro Val Cys Gly Gln Ala Trp Ala Trp His Glu Asp Val Gly  
 3105 3110 3115 3120

Glu Ser Gly Gly Gly Pro Val Pro Gly Val Val Val Leu Arg Cys Pro  
 3125 3130 3135

Asp Ala Gly Ala Asp Gly Gly Gly Gly Gly Val Gly Glu Val Val  
 3140 3145 3150

Gly Gly Val Leu Gly Val Val Gln Gly Trp Leu Gly Leu Glu Arg Phe  
 3155 3160 3165

Ala Gly Ser Arg Leu Val Val Val Thr Arg Gly Ala Val Val Ala Gly  
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Pro Glu Asp Gly Pro Val Asp Val Val Gly Ala Ala Val Trp Gly Leu  
 3185 3190 3195 3200

Val Arg Ser Ala Gln Ala Glu His Pro Asp Arg Phe Val Leu Leu Asp  
 3205 3210 3215

Leu Asp Thr Asp Leu Asp Ser Gly Ala Asp Ala Asp Ala Gly Asn Glu  
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Ala Gly Met Gly Ser Gly Leu Asp Gly Gly Arg Val Ala Ala Val Val  
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Ala Cys Gly Glu Pro Gln Leu Ala Val Arg Gly Glu Arg Val Leu Ala  
 3250 3255 3260

Ala Arg Leu Thr Arg Leu Glu Ser Pro Val Asp Val Ser Gly Arg Glu  
 3265 3270 3275 3280

Val Leu Pro Trp Leu Ser Gly Gly Ser Val Leu Val Thr Gly Gly Thr  
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Gly Val Leu Gly Ala Ala Val Ala Arg His Leu Ala Gly Val Cys Gly  
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Val Arg Asp Leu Leu Leu Val Ser Arg Arg Gly Pro Asp Ala Pro Gly  
3315 3320 3325

Ala Glu Gly Leu Arg Ala Glu Leu Ala Ala Leu Gly Ala Glu Val Arg  
3330 3335 3340

Ile Val Ala Cys Asp Val Gly Glu Arg Arg Glu Val Val Arg Leu Leu  
3345 3350 3355 3360

Glu Gly Val Pro Ala Gly Cys Pro Leu Thr Gly Val Val His Ala Ala  
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Gly Val Leu Asp Asp Ala Thr Ile Ala Ser Leu Thr Pro Glu Arg Leu  
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Gly Thr Val Phe Ala Ala Lys Val Asp Ala Ala Leu Leu Leu Asp Glu  
3395 3400 3405

Leu Thr Arg Gly Met Glu Leu Ser Ala Phe Val Leu Phe Ser Ser Ala  
3410 3415 3420

Ala Gly Ile Leu Gly Ser Ala Gly Gln Gly Asn Tyr Ala Ala Ala Asn  
3425 3430 3435 3440

Ala Ala Leu Asp Ala Leu Ala Tyr Arg Arg Arg Ala Ala Gly Leu Pro  
3445 3450 3455

Gly Val Ser Leu Ala Trp Gly Leu Trp Glu Glu Ala Ser Gly Met Thr  
3460 3465 3470

Gly His Leu Ala Gly Thr Asp His Arg Arg Ile Ile Arg Ser Gly Leu  
3475 3480 3485

His Pro Met Ser Thr Pro Asp Ala Leu Ala Leu Phe Asp Ala Ala Leu  
3490 3495 3500

Ala Leu Asp Arg Pro Val Leu Leu Pro Ala Asp Leu Arg Pro Ala Pro  
3505 3510 3515 3520

Pro Leu Pro Pro Leu Leu Gln Asp Leu Leu Pro Ala Thr Arg Arg Arg  
3525 3530 3535

Thr Thr Arg Thr Thr Thr Thr Gly Gly Ala Asp Asn Gly Ala Gln Leu  
3540 3545 3550

His Ala Arg Leu Ala Gly Gln Thr His Glu Gln Gln His Thr Thr Leu  
3555 3560 3565

Leu Ala Leu Val Arg Ser His Ile Ala Thr Val Leu Gly His Asn Ala  
3570 3575 3580

Pro Glu Met Ile Pro Val Asp Ser Ala Phe Arg Asp Leu Gly Phe Asp  
3585 3590 3595 3600

Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Gly Glu Ala Thr Gly  
3605 3610 3615

Leu Arg Leu Pro Thr Ser Leu Val Phe Asp Gln Pro Asn Ala Ala Thr  
3620 3625 3630

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Leu Ala Arg His Leu Arg Arg Glu Leu Met Gly Asp Asp Ala Glu Gly  
 3635 3640 3645  
 Glu Thr Pro Ser Gln Val Ala Leu His Gln Val Ala Ala Asp Glu Pro  
 3650 3655 3660  
 Ile Ala Ile Val Gly Met Ala Cys Arg Phe Pro Gly Gly Val Cys Ser  
 3665 3670 3675 3680  
 Pro Glu Glu Leu Trp Glu Leu Val Ala Ser Gly Gly Asp Ala Ile Gly  
 3685 3690 3695  
 Glu Phe Pro Ala Gly Arg Gly Trp Asp Leu Glu Gly Leu Phe Asp Ser  
 3700 3705 3710  
 Asp Pro Asp Arg Ser Gly Thr Ser Tyr Ala Arg Tyr Gly Gly Phe Leu  
 3715 3720 3725  
 Tyr Glu Ala Gly Glu Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg  
 3730 3735 3740  
 Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Ser  
 3745 3750 3755 3760  
 Trp Glu Ala Phe Glu Arg Ala Gly Ile Asp Pro Leu Ser Met Arg Gly  
 3765 3770 3775  
 Ser Arg Thr Gly Val Phe Ala Gly Val Met Tyr His Asp Tyr Ala Ala  
 3780 3785 3790  
 Arg Leu His His Val Pro Glu Gly Phe Glu Gly Leu Ile Ala Asn Gly  
 3795 3800 3805  
 Ser Ala Gly Ser Val Ala Thr Gly Arg Val Ala Tyr Ser Phe Gly Leu  
 3810 3815 3820  
 Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu Val  
 3825 3830 3835 3840  
 Ala Leu His Trp Ala Ala Gln Ala Leu Arg Ala Gly Glu Cys Ser Met  
 3845 3850 3855  
 Ala Leu Ala Gly Gly Val Thr Val Met Ser Ser Pro Gly Thr Phe Val  
 3860 3865 3870  
 Glu Phe Ser Arg Gln Arg Gly Leu Ala Ala Asp Gly Arg Cys Lys Ala  
 3875 3880 3885  
 Tyr Ser Ala Ala Ala Asp Gly Thr Gly Trp Ala Glu Gly Val Gly Met  
 3890 3895 3900  
 Leu Leu Val Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His Arg Val  
 3905 3910 3915 3920  
 Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn  
 3925 3930 3935  
 Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Gln  
 3940 3945 3950

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Ala Leu Ala Asn Ala Gly Leu Thr Pro Ala Asp Val Asp Ala Val Glu  
3955 3960 3965

Gly His Gly Thr Gly Thr Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala  
3970 3975 3980

Leu Leu Ala Ala Tyr Gly Gln His Arg Pro His His Arg Pro Leu Trp  
3985 3990 3995 4000

Leu Gly Ser Leu Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala Gly  
4005 4010 4015

Val Gly Gly Val Ile Lys Met Val Met Ala Leu Arg Asn Gly Leu Leu  
4020 4025 4030

Pro Gln Thr Leu His Val Asp Glu Pro Thr Pro Gln Val Asp Trp Ser  
4035 4040 4045

Thr Gly Ala Val Gln Leu Leu Thr Gln Pro Val Pro Trp Pro Ala Asp  
4050 4055 4060

Pro Ala Gly Arg Pro Arg His Ala Gly Val Ser Ser Phe Gly Val Ser  
4065 4070 4075 4080

Gly Thr Asn Ala His Val Ile Leu Glu Glu Ala Pro Ala Ala Ala Gly  
4085 4090 4095

Gly Ala Ala Gly Gly Gly Val Ser Val Gly Ala Pro Asn Pro Ala Leu  
4100 4105 4110

Pro Val Ala Glu Ser Glu Pro Val Pro Val Pro Val Pro Val Ser Ala  
4115 4120 4125

Arg Ser Glu Ala Gly Leu Arg Ala Gln Ala Gln Ala Leu Arg Gln Tyr  
4130 4135 4140

Val Ala Ala Arg Pro Asp Met Ser Pro Ala Asp Ile Gly Ala Gly Leu  
4145 4150 4155 4160

Ala Arg Gly Arg Ala Val Leu Glu His Arg Ala Val Ile Leu Ala Ala  
4165 4170 4175

Asp Arg Glu Glu Leu Ala Gln Ala Leu Thr Ala Leu Ala Ala Gly Glu  
4180 4185 4190

Pro His Pro His Ile Thr Thr Gly His Thr Arg Gly Ser Asp Arg Gly  
4195 4200 4205

Gly Val Val Phe Val Phe Pro Gly Gln Gly Gly Gln Trp Ala Gly Met  
4210 4215 4220

Gly Leu Thr Leu Leu Thr Ser Ser Pro Val Phe Ala Glu His Ile Asp  
4225 4230 4235 4240

Ala Cys Glu Lys Ala Leu Thr Pro Trp Val Pro Trp Ser Leu Thr Asp  
4245 4250 4255

Ile Leu His Arg Asp Pro Asp Asp Pro Ala Trp Gln Gln Ala Asp Val  
4260 4265 4270



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Val Gln Pro Val Leu Phe Ser Ile Met Val Ser Leu Ala Ala Leu Trp  
4275 4280 4285

Arg Ser Tyr Gly Ile Glu Pro Asp Ala Val Leu Gly His Ser Gln Gly  
4290 4295 4300

Glu Ile Ala Ala Ala His Ile Cys Gly Ala Leu Ser Leu Lys Asp Ala  
4305 4310 4315 4320

Ala Lys Thr Val Ala Leu Arg Ser Gln Ala Leu Ala Ala Val Arg Gly  
4325 4330 4335

Arg Gly Ala Met Val Ser Leu Pro Leu Pro Ala Gln Asp Val Gln Gln  
4340 4345 4350

Leu Ile Ser Glu Arg Trp Glu Gly Gln Leu Trp Val Ala Ala Leu Asn  
4355 4360 4365

Gly Pro His Ser Thr Thr Val Ser Gly Asp Thr Thr Ala Val Glu Glu  
4370 4375 4380

Leu Leu Thr His Cys Ala Asp Thr Gly Leu Arg Ala Lys Arg Ile Pro  
4385 4390 4395 4400

Val Asp Tyr Ala Ser His Cys Pro His Val Gln Pro Leu His Asp Glu  
4405 4410 4415

Leu Leu His Leu Leu Gly Asp Ile Thr Pro Gln Pro Ser Thr Met Pro  
4420 4425 4430

Phe Phe Ser Thr Val Val Gly His Leu Val Trp Tyr Thr Thr Thr Leu  
4435 4440 4445

Asp Ala Ala Tyr Trp Tyr Arg Asn Leu His Gln Pro Val Arg Phe Ser  
4450 4455 4460

His Ala Ile Gln Thr Leu Thr Asp Asp Gly His Arg Pro Phe Ile Glu  
4465 4470 4475 4480

Ile Ser Pro His Pro Thr Leu Val Pro Ala Ile Glu Asp Thr Thr Glu  
4485 4490 4495

Asn Thr Thr Glu Asn Ile Thr Ala Thr Gly Ser Leu Arg Arg Gly Asp  
4500 4505 4510

Asn Asp Thr His Arg Phe Leu Thr Ala Leu Ala His Thr His Thr Thr  
4515 4520 4525

Gly Ile Arg Thr Pro Thr Thr Trp His His His Tyr Thr Gln Thr His  
4530 4535 4540

Pro His Pro His Asn His His Leu Asp Leu Pro Thr Tyr Pro Phe Gln  
4545 4550 4555 4560

His Gln His Tyr Trp Leu Gln Pro Pro Thr Thr Thr Thr Asp Leu Thr  
4565 4570 4575

Thr Thr Gly Leu Thr Pro Thr His His Pro Leu Leu Thr Ala Thr Leu  
4580 4585 4590

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101280" 98241660

Thr Leu Ala Asn Asn Asn Thr Gln Leu Leu Thr Gly Arg Leu Ser Leu	4595	4600	4605
Arg Thr His Pro Trp Leu Thr Asp His Thr Val Val Gly Thr Thr Leu	4610	4615	4620
Val Pro Gly Thr Ala Leu Leu Glu Leu Ala Leu Gln Ala Thr Thr Thr	4625	4630	4635 4640
Asp His Leu Glu Glu Leu Ala Leu His Thr Pro Leu Val Ile Pro Arg	4645	4650	4655
Glu Gly Ala Val Asp Val Gln Val His Ile Asn Pro Pro Asp Asp Thr	4660	4665	4670
Asp Thr Arg Ser Leu Thr Ile Tyr Ser Arg Ser Glu Asn Ala Pro Ala	4675	4680	4685
Ala Ala Pro Trp Arg His His Ala Thr Ala Val Leu Gly Thr Lys Thr	4690	4695	4700
Ser Arg Ile Glu Thr Gly Arg Ser His Asp Asp Leu Ser Met Trp Pro	4705	4710	4715 4720
Pro Ala Gly Ala Val Arg Cys Ala Asp Glu Glu Leu Ala Ala Leu Tyr	4725	4730	4735
Gly Asp Tyr Glu Ala Asn Gly Phe Val Tyr Gly Pro Ala Phe Arg Gly	4740	4745	4750
Leu Thr Ala Ala Trp Arg Leu Gly Asp Glu Val Phe Ala Glu Val Arg	4755	4760	4765
Leu Pro Glu Gln Val His Gly Glu Ala Ser Ala Tyr Asn Leu His Pro	4770	4775	4780
Ala Leu Leu Asp Ala Ala Leu His Ala Ala Ala Phe Ala Pro Ser Gly	4785	4790	4795 4800
Ser Leu Pro Gln Gly Ser Val Pro Phe Ser Phe Thr Gly Val Thr Leu	4805	4810	4815
His Ala Ala Asn Ala Ser Ser Leu Arg Val Arg Leu Ser Pro Ala Asp	4820	4825	4830
Pro Asn Ser Gly His Ala Ala Val Ser Val Leu Val Thr Asp Asp Thr	4835	4840	4845
Gly Thr Pro Val Ala Ser Val Glu Ala Leu Ala Val Arg Pro Leu Ala	4850	4855	4860
Ala Asp Glu Leu Arg Ala Ala Glu Arg Ala Val Gln Arg Ala Glu Leu	4865	4870	4875 4880
Phe Asp Met Lys Trp Val Glu Val Pro Ser Asp Val Leu Val Ser Gly	4885	4890	4895
Gly Ala Ser Val Val Val Leu Asp Gly Ala Asp Asp Leu Val Gly Leu	4900	4905	4910

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Ala Ala Glu Glu Asp Gly Val Pro Gly Val Val Val Leu Arg Cys Pro  
4915 4920 4925

Asp Ala Gly Ala Asp Gly Gly Gly Gly Gly Gly Val Gly Glu Val  
4930 4935 4940

Val Gly Gly Val Leu Gly Val Val Gln Gly Trp Leu Gly Leu Glu Arg  
4945 4950 4955 4960

Phe Ala Gly Ser Arg Leu Val Val Val Thr Arg Gly Ala Val Val Ala  
4965 4970 4975

Gly Pro Glu Asp Gly Pro Val Asp Gly Pro Val Asp Val Val Gly Ala  
4980 4985 4990

Ala Val Trp Gly Leu Val Arg Ser Ala Gln Ala Glu His Pro Asp Arg  
4995 5000 5005

Phe Val Leu Leu Asp Leu Asp Thr Asp Leu Asp Ser Gly Ala Asp Arg  
5010 5015 5020

Asp Ala Gly Asn Glu Ala Gly Met Gly Ser Gly Leu Asp Gly Gly Arg  
5025 5030 5035 5040

Val Ala Ala Val Val Ala Cys Gly Glu Pro Gln Leu Ala Val Arg Gly  
5045 5050 5055

Glu Arg Val Leu Ala Ala Arg Leu Thr Arg Leu Glu Ser Pro Val Asp  
5060 5065 5070

Val Ser Gly Arg Glu Val Leu Pro Trp Leu Ser Gly Gly Ser Val Leu  
5075 5080 5085

Val Thr Gly Gly Thr Gly Val Leu Gly Ala Ala Val Ala Arg His Leu  
5090 5095 5100

Ala Gly Val Cys Gly Val Arg Asp Leu Leu Leu Val Ser Arg Arg Gly  
5105 5110 5115 5120

Pro Asp Ala Pro Gly Ala Glu Gly Leu Arg Ala Glu Leu Ala Ala Leu  
5125 5130 5135

Gly Ala Glu Val Arg Ile Val Ala Cys Asp Val Gly Glu Arg Arg Glu  
5140 5145 5150

Val Val Arg Leu Leu Glu Gly Val Pro Ala Gly Cys Pro Leu Thr Gly  
5155 5160 5165

Val Val His Ala Ala Gly Val Leu Asp Asp Ala Thr Ile Ala Ser Leu  
5170 5175 5180

Thr Pro Glu Arg Leu Gly Thr Val Phe Ala Ala Lys Val Asp Ala Ala  
5185 5190 5195 5200

Leu Leu Leu Asp Glu Leu Thr Arg Gly Met Glu Leu Ser Ala Phe Val  
5205 5210 5215

Leu Phe Ser Ser Ala Ala Gly Ile Leu Gly Ser Ala Gly Gln Gly Asn  
5220 5225 5230

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Tyr Ala Ala Ala Asn Ala Ala Leu Asp Ala Leu Ala Tyr Arg Arg Arg  
5235 5240 5245

Ala Ala Gly Leu Pro Gly Val Ser Leu Ala Trp Gly Leu Trp Glu Glu  
5250 5255 5260

Ala Ser Gly Met Thr Gly His Leu Ala Gly Thr Asp His Arg Arg Ile  
5265 5270 5275 5280

Ile Arg Ser Gly Leu His Pro Met Ser Thr Pro Asp Ala Leu Ala Leu  
5285 5290 5295

Phe Asp Ala Ala Leu Ala Leu Asp Arg Pro Val Leu Leu Pro Ala Asp  
5300 5305 5310

Leu Arg Pro Ala Pro Pro Leu Pro Pro Leu Leu Gln Asp Leu Leu Pro  
5315 5320 5325

Ala Thr Arg Arg Arg Thr Thr Arg Thr Thr Thr Thr Gly Gly Ala Asp  
5330 5335 5340

Asn Gly Ala Gln Leu His Gly Arg Leu Ala Gly Gln Thr His Glu Gln  
5345 5350 5355 5360

Gln His Thr Thr Leu Leu Ala Leu Val Arg Ser His Ile Ala Thr Val  
5365 5370 5375

Leu Gly His Thr Thr Pro Asp Thr Ile Pro Pro Asp Arg Ala Phe Arg  
5380 5385 5390

Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu  
5395 5400 5405

Ser His Thr Thr Gly Leu Arg Leu Pro Thr Thr Leu Ala Phe Asp His  
5410 5415 5420

Pro Asn Pro Thr Thr Leu Thr His His Leu His Thr Gln Leu Val Ser  
5425 5430 5435 5440

Lys Gly Leu Thr Ala Ala Ala Glu Pro Asp Ala Ala Thr Thr Pro Pro  
5445 5450 5455

Gly Leu Pro Ser Leu Leu Ser Glu Leu Glu Arg Leu Glu Ala Val Val  
5460 5465 5470

Leu Ser Ser Thr Thr Ser Ser Ala Ala Pro Leu Asp Asp Gly Ala Arg  
5475 5480 5485

Thr Arg Leu Ala Ser Arg Leu His Ser Leu Ala Gln Lys Leu Asn Gly  
5490 5495 5500

Asp Asp Thr Ala Pro Asp Leu Ala Glu Thr Ser Asp Glu Glu Met Phe  
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Ala Leu Ile Asp Arg Glu Val Gly Phe Glu Ser Gln  
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<212> DNA

<213> Streptomyces avermitilis

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1				5				10					15			
gga	ctc	gac	ccc	acc	gaa	cac	ccc	cta	ctc	ggc	gcc	aca	ttg	gaa	ctg	96
Gly	Leu	Asp	Pro	Thr	Glu	His	Pro	Leu	Leu	Gly	Ala	Thr	Leu	Glu	Leu	
			20					25					30			
gcg	act	gac	ggt	gga	gcg	ctt	ctt	gca	ggg	cgc	ttg	tct	ttg	agg	tcg	144
Ala	Thr	Asp	Gly	Gly	Ala	Leu	Leu	Ala	Gly	Arg	Leu	Ser	Leu	Arg	Ser	
		35					40					45				
cat	ccg	tgg	ctg	gct	gac	tac	gag	gtc	ggc	ggc	acg	gtg	ctg	ctg	tcg	192
His	Pro	Trp	Leu	Ala	Asp	Tyr	Glu	Val	Gly	Gly	Thr	Val	Leu	Leu	Ser	
	50					55					60					
ggc	gcc	acc	ttc	ctc	gaa	ctc	gcc	ctt	cat	gcg	ggc	aca	tac	gtg	ggc	240
Gly	Ala	Thr	Phe	Leu	Glu	Leu	Ala	Leu	His	Ala	Gly	Thr	Tyr	Val	Gly	
65					70					75					80	
tgc	gac	cga	gtg	gat	gag	ctg	acg	ctg	cat	gcg	ccg	ctg	gtg	gtt	cct	288
Cys	Asp	Arg	Val	Asp	Glu	Leu	Thr	Leu	His	Ala	Pro	Leu	Val	Val	Pro	
				85					90					95		
gtg	gat	ggg	ggt	gtg	agt	gtg	cag	gtt	ggg	gtt	gcg	gct	gcg	gat	ggg	336
Val	Asp	Gly	Gly	Val	Ser	Val	Gln	Val	Gly	Val	Ala	Ala	Ala	Asp	Gly	
			100					105					110			
gag	ggg	cgg	cgt	ttg	gtg	agt	gtg	tat	gcg	cgg	ggt	ggg	agt	gct	tgt	384
Glu	Gly	Arg	Arg	Leu	Val	Ser	Val	Tyr	Ala	Arg	Gly	Gly	Ser	Ala	Cys	
		115					120					125				
ggt	ggg	ggt	ggt	gcg	tcg	ggt	ggg	gtg	tgg	acg	tgt	cat	gcc	tcg	ggg	432
Gly	Gly	Gly	Gly	Ala	Ser	Gly	Gly	Val	Trp	Thr	Cys	His	Ala	Ser	Gly	
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gtg	ctg															438
Val	Leu															
145																

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<211> 146

<212> PRT

<213> Streptomyces avermitilis

<400> 8

Tyr	Trp	Leu	Glu	Ser	Thr	Gln	Pro	Gly	Ala	Gly	Asn	Val	Ser	Ala	Ala
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Gly	Leu	Asp	Pro	Thr	Glu	His	Pro	Leu	Leu	Gly	Ala	Thr	Leu	Glu	Leu
			20					25					30		

Ala Thr Asp Gly Gly Ala Leu Leu Ala Gly Arg Leu Ser Leu Arg Ser  
35 40 45

His Pro Trp Leu Ala Asp Tyr Glu Val Gly Gly Thr Val Leu Leu Ser  
50 55 60

Gly Ala Thr Phe Leu Glu Leu Ala Leu His Ala Gly Thr Tyr Val Gly  
65 70 75 80

Cys Asp Arg Val Asp Glu Leu Thr Leu His Ala Pro Leu Val Val Pro  
85 90 95

Val Asp Gly Gly Val Ser Val Gln Val Gly Val Ala Ala Ala Asp Gly  
100 105 110

Glu Gly Arg Arg Leu Val Ser Val Tyr Ala Arg Gly Gly Ser Ala Cys  
115 120 125

Gly Gly Gly Gly Ala Ser Gly Gly Val Trp Thr Cys His Ala Ser Gly  
130 135 140

Val Leu  
145

<210> 9  
<211> 30  
<212> DNA  
<213> Artificial Sequence

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<223> Primer from the sequence between 9098 and 9127 of SEQ ID NO:1

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ggctggctga ctacgaggtc ggcggcacgg

30

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<211> 30  
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<213> Artificial Sequence

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<223> Antisense primer from the sequence between 9193 and 9222 of SEQ ID NO:1

<400> 10  
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30

<210> 11  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Antisense primer from the sequence between 9098 and 9127 of SEQ ID NO:1

<400> 11

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ccgtgccgcc gacctcgtag tcagccagcc

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<210> 12

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Primer from the sequence between 8948 and 8977 of SEQ ID NO:1

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30

<210> 13

<211> 10

<212> PRT

<213> Streptomyces avermitilis

<220>

<221> SITE

<222> 2, 3, 4, 6, 7, 8, 9

<223> Xaa denotes an unspecified amino acid

<400> 13

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<210> 14

<211> 10

<212> PRT

<213> Streptomyces avermitilis

<220>

<221> SITE

<222> 2, 3, 4, 6, 7, 8, 9

<223> Xaa denotes an unspecified amino acid

<400> 14

His Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Ser  
1 5 10

<210> 15

<211> 10

<212> PRT

<213> Streptomyces avermitilis

<220>

<221> SITE

<222> 2, 3, 4, 6, 7, 8, 9

<223> Xaa denotes an unspecified amino acid

<400> 15

Tyr Xaa Xaa Xaa Gly Xaa Xaa Xaa Xaa Ser  
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<210> 16

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<211> 10  
<212> PRT  
<213> Streptomyces avermitilis

<400> 16  
His Ala Val Gly Gly Thr Val Leu Leu Ser  
1 5 10

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